MOBILE APPLICATION FOR THE MANAGEMENT OF PERSONAL TRAINING

This is the Final Degree Work memory of Design and Development of Videogames . The goal is the development of a mobile application that manages the users and the results obtained through of training by error messages. Special attention and care will be taken in the realization of the interface, making it as "friendly" as possible. It is also necessary to create a database that stores all the pertinent information, linking the data and the results of the training of the users. This database belongs to the service offered by Backendless and is hosted in the cloud so that the mobile application can access. On the other hand, my partner Carlos Hernández is in charge of the development of a video game using the visual capture of movement. This system is the one that extracts and sends the different data (times, errors ...) to the database.

TFG
SUMMARY

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TRABAJO DE
FINAL DE
GRADO
VJ1241

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INTRODUCTION

The realization of this Assignment is part of the subject ¨Final Degree project¨where all the information of it is collected. This subject belongs to the academic trajectory of the degree in design and development of video games, held at the Jaume I University during the 2018/19 academic year.

This assignment is formed by five chapters,encompassing everything from planning and realization to the results obtained. The activities began in february and were extended until may making a total amount of 300 hours.

In this first section we describe the work motivation of the project, the objectives, the subjects related to the career and the initial state of work in where we talk about all the decisions that have been made before starting the project, both externally imposed and self-imposed.

WORK MOTIVATION

The motivation of this idea comes from the intention to create an innovative business based on the problems encountered by personal trainers and clients to get personalized quality trainings with a greater number of sessions, being able to compete with less personalized gyms.

Thanks to the development of this technology, it would be possible to cover the following needs:

1. Having to travel to the training place.
2. Avoid injuries due to bad executions.
3. Increase the number of training sessions without a higher cost.
4. Create a more enjoyable and fun workout through gamification.

OBJECTIVES

First of all I want to highlight this TFG is an interrelated project. On the one hand I will create a mobile application and a database that will be hosted on a web server, in this database the information of the users will be collected. This will allow to show the information in the mobile application of the personal trainer in different ways, such as graphics, text messages, percentages...

To make this happen, the project is divided into the following objectives:

➔ "Develop a mobile application to manage users information"

➔ "Make a comfortable interface to facilitate the use to the personal trainers"

➔ "Create a database that stores all user data, both personal and those obtained from their workouts"

➔ "Generate a web server where the database is hosted and the mobile application can access"

On the other hand, Carlos Hernández will carry out the gamification and data collection by means of a videogame that will use the visual system of movement capture with which it is intended to obtain all the information.

RELATED SUBJECTS

Table. 1.1.1 Related Subjects

Codes	Subjects
VJ1203	Programación I
VJ1208	Programación II
VJ1220	Bases de Datos
VJ1228	Redes y Sistemas Multijugador
VJ1229	Diseño de Aplicaciones Móviles
VJ1235	Iniciativa Empresarial

ENVIRONMENT AND INITIAL STATE

WORK ENVIRONMENT

The human team consists of two people, each of whom performs a different TFG and whose final result complements each other. This requires a special way of working, where you must be informed of the evolution of the partner's project. In addition to sharing the progress, the common aspects should also be discussed. As it is the case of the DB with the information of the users, the routines... Mention must also be made of the limitations of a job, since they can influence the development of the other, cutting certain aspects or hindering certain parts..

INITIAL STATE

The project begins in the subject of Business initiative, as it is an idea that was originated in the assignment of this subject. The TFG begins from zero with the inconveniences that this entails; we must study all the possibilities in terms of databases, serves, development environments…

INTERNAL DECISIONS

1. The project must have a database that can be shared between the two jobs, where the following data will be stored:
    - Information of Users.
    - Routine information.
    - Information of exercises.
2. This database must be hosted on an online server.
3. The coach must create the routines that will appear later in the game.

EXTERNAL DECISIONS

1. It has to be developed a technical proposal, a document of analysis and design and a memory of the TFG written all of it in english.In addition to a well differentiated development by the two students, where direct active participation on the other's projects will not be allowed.
2. That the database can be accessed with Unity.
3. The user profile must be completed by the user inside the video game.

PLANNING AND RESOURCES EVALUATION

In this chapter, detailed planning of all tasks and time of work is shown, ranging from the Technical proposal to the presentation of the same. Besides includes all the subtasks that provide information, such as dependency between tasks or why certain actions have been taken.

It also describes the evaluation of resources, that is, the human resources and the necessary equipment to develop and implement the work, as well as the estimated cost of these resources.

PLANNING

The list of tasks to be performed show all the main tasks of the project, in some cases there are subprocesses. After this list, the main tasks that have subtasks under their charge will be shown in more detail. Mention will be made of the dependencies between them and the part of the motion capture video game, and in some cases the reason for said tasks will be indicated.

Table. 2.1.1 Planning

Task to be performed	Start	End	Duration
TFG Technical Proposal	01/02/2019	04/02/2019	4
Design of the online database	04/02/2019	06/02/2019	10
Design of the mobile application	07/02/2019	13/02/2019	24
Creating the database on a server	14/02/2019	17/02/2019	8
Creation of the web page	18/02/2019	21/02/2019	8
Analysis and design document	22/02/2019	25/02/2019	5
Creation of the exercises screen and initial menu	26/02/2019	28/02/2019	7
Creation of user screens	01/03/2019	15/03/2019	40
Creation of routine screens	16/03/2019	26/03/2019	31
Redesign and adjustments of interface elements	27/03/2019	28/03/2019	6
Creation of the information screen	29/03/2019	29/03/2019	4
Study of available online DB	30/03/2019	30/03/2019	4
Creation of a database in Firebase	31/03/2019	04/04/2019	14
Creation of a database in Backendless	05/04/2019	08/04/2019	10
Creation of the session and linking screen	04/04/2019	14/04/2019	11
Linking the user screen with the DB	15/04/2019	20/04/2019	16
Linking the routine screen with the DB	21/04/2019	23/04/2019	13
Linking the exercises screen and errors	24/04/2019	24/04/2019	6
Interaction of user buttons	25/04/2019	25/04/2019	4
Search and design UI screen	26/04/2019	29/04/2019	14
Error correction	30/04/2019	03/05/2019	15
Interaction of routine buttons	04/05/2019	05/05/2019	6
Perform memory	07/05/2019	03/06/2019	30
Preparation of the presentation	04/06/2019	10/06/2019	10
Total			300

TFG TECHNICAL PROPOSAL

The technical proposal was made in an iterative way with the partner, in order to establish in a precise way all the points that the would include.

SUBTASK

- 2 Hours of realization.
- 1 Hour of layout.
- 1 Hour of transcription and correction in English.

DESIGN OF THE ONLINE DATABASE

In order to establish in a precise way the data that would be needed for the correct functioning of the two projects. The design of the Online Database was done iteratively with the partner.

SUBTASK

- 1 Hour thinking and writing down all the information that has to be collected.
- 3 entity relationship diagram.
- 3 UML diagram.
- 3 Changes in the diagrams and data after the meeting with Merche marques (DB teacher).

DESIGN OF THE MOBILE APPLICATION

This section is the key for the realization of the screens of the application. Although they are not a true reflection of the final result, it serves to make an idea of what is being shown on each screen. Each screen was verified by the partner in order to clarify the different data that should be shown in the application.

SUBTASK

- 1 Hour for the realization of the Use Cases.
- 2 Hours for the realization of Activity Diagrams.
- 1 Hour for the class diagrams and the architecture of the system.
- 20 Hours for the interfaces design.

CREATING THE DATABASE ON A SERVER

This section is essential for communication between TFGs.

SUBTASK

- 4 Hours Searching of host and domain.
- 1 Hour to understand how 000webhost works.
- 1 Hour to remember how PhpMyadmin worked..
- 2 Horas for the creation of the database.

CREATION OF THE WEB PAGE

This task was developed to help with the communication of the project and as a presentation of TFG, in addition to helping the tutor in the follow-up of the two projects. Also so that both of us could have constancy at all times of what part the partner was working on.

SUBTASK

- 6 Hours for the web creation.
- 2 Hours for the Roadmap creation.

ANALYSIS AND DESIGN DOCUMENT

The document has been made in an iterative way with the partner, in order to not make mistakes regarding to projects.

SUBTASK

- 4 Hours of realization.
- 1 Hour of transcription and correction to English.

CREATION OF THE EXERCISES SCREEN AND INITIAL MENU

The main menu follows the same model as whatsapp, that is, a View Pager. They are divided into 3 tabs, one for the user section, one for the routines and one last for the exercises. The exercises screen directly affects when creating new routines.

SUBTASK

- 5 Hours of implementation of the Initial menu.
- 2 Hours of implementation of the initial menu of exercises.

CREATION OF USER SCREENS

The user screens are divided into 3 parts, one belongs to the initial menu in the user section and the other to user creation, where none is independent of anyone. Finally, there is the profile of the user that is linked to the initial user menu.

SUBTASK

- 3 Hours of implementation of the initial user menu.
- 10 Hours of user creation.
- 27 Hours of user profile development.

CREATION OF ROUTINE SCREENS

The routine screens are divided into 3 parts, one belongs to the initial menu in the routine section and another to the creation of routine, where none does not depend on anyone. Finally there is the profile of the routine that is linked to the initial routine menu.

SUBTASK

- 1 hour of Implementation time of the users start menu.
- 20 Hours of routine creation.
- 10 Hours of profile development of the routine.

CREATION OF A DATABASE IN FIREBASE

The research of the databases was done while waiting for the progress of the partner TFG. When discovering Firebase[1] and the security it provided, It was decided to implement it. But problems arose since the database was working an NoSQL model. Both in the implementation and in the investigation the partner was aware of everything since this fact affected him in an indirect way.

SUBTASK

- 8 Hours of research and tests.
- 2 Hours of implementation.
- 4 Hours of problems and inconveniences.

CREATION OF A DATABASE IN BACKENDLESS

Having several problems due to the NoSQL model of Firebase, it was decided to investigate the service that Backendless offered. besides to security and authentification also grant an internal accommodation to store files among many other things. This was the second reason why we decided to use Backendless [2]. Because in the future it will have to save the videos of the mistakes that a user makes. Both in the implementation and in the investigation the partner was aware of everything since this fact affected him in an indirect way.

SUBTASK

- 5 Hours of research and testing.
- 3 Hours of implementation.
- 2 Hours in solving problems and inconveniences.

CREATION OF THE SESSION AND LINKING SCREEN

This task depended directly on the database, which is why it was developed in parallel. This caused an increase in times and generated several problems.

SUBTASK

- 5 Hours of research and implementation
- 2 Linking hours
- 2 Hours in solving problems and inconveniences.

RESOURCES EVALUATION

If there is only one worker to develop this project, a total of 270h would be required to achieve the results shown. Next we will show the different costs (without VAT) in order to evaluate the final price and the profits that said worker would have.

TECHNICAL TEAM

The technical team shown below to implement this application may be different. In this case, we have opted for free programs and services to maximize profits.

The following elements are required to develop this application:

1. **a computer**,in this case has been developed with a computer Leonovo Ideapad G560 0679 (455€).

Table. 2.2.1 Technical Team

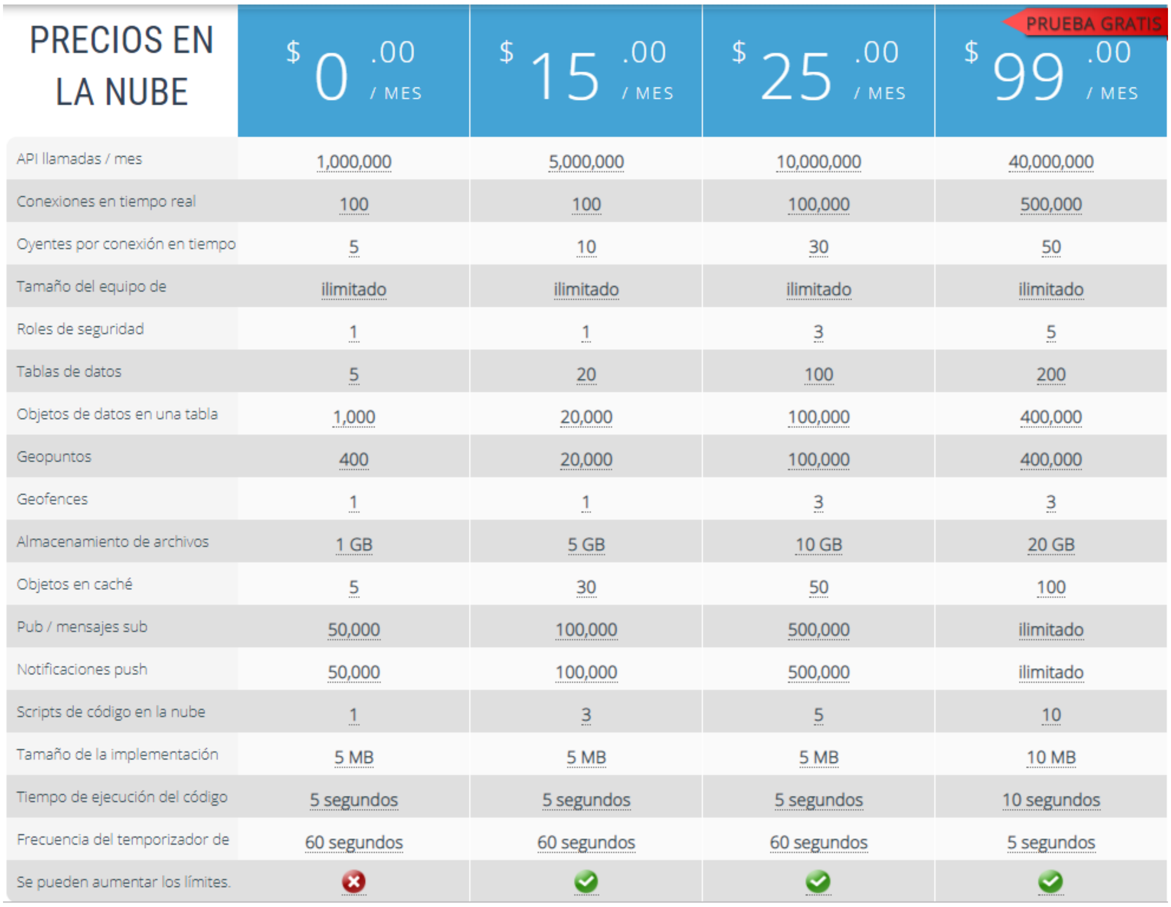
Components	Characteristics
Processor	Intel i3-33M
RAM	4 GB
Hard Disk	500GB
Graphic Card	NVIDIA GeForce 310M 512 Mb

2. **Connection to internet.**
3. **Android Studio** (free) or a programme to create a code in Android.
4. **Backendless** or another service that allows you to have an online DB, in this case the service is free.

OTHER BACKENDLESS SERVICES

Table. 2.2.2. Other Backendless Services

Service	Duration	Price
Free	Month	0$
Developer	Month	15$
Cloud 9	Month	25$
Cloud 99	Month	99$



PRECIOS EN LA NUBE	$ 0 .00 / MES	$ 15 .00 / MES	$ 25 .00 / MES	PRUEBA GRATIS $ 99 .00 / MES
API llamadas / mes	1,000,000	5,000,000	10,000,000	40,000,000
Conexiones en tiempo real	100	100	100,000	500,000
Oyentes por conexión en tiempo	5	10	30	50
Tamaño del equipo de	ilimitado	ilimitado	ilimitado	ilimitado
Roles de seguridad	1	1	3	5
Tablas de datos	5	20	100	200
Objetos de datos en una tabla	1,000	20,000	100,000	400,000
Geopuntos	400	20,000	100,000	400,000
Geofences	1	1	3	3
Almacenamiento de archivos	1 GB	5 GB	10 GB	20 GB
Objetos en caché	5	30	50	100
Pub / mensajes sub	50,000	100,000	500,000	ilimitado
Notificaciones push	50,000	100,000	500,000	ilimitado
Scripts de código en la nube	1	3	5	10
Tamaño de la implementación	5 MB	5 MB	5 MB	10 MB
Tiempo de ejecución del código	5 segundos	5 segundos	5 segundos	10 segundos
Frecuencia del temporizador de	60 segundos	60 segundos	60 segundos	5 segundos
Se pueden aumentar los límites.	✗	✓	✓	✓

Figure 2.1 Backendless Services.

This service is valid for the development of the TFG but if it is commercialized it would be necessary to search and compare with other services. In that case, the monthly payment for this service would be inevitable, something to be taken into account since it would affect the price.

As you can see the technical equipment necessary to develop this project is very basic and therefore will not be taken into account. It does not require extremely high or expensive requirements, being something that every developer has in his place of work.

HUMAN RESOURCES

One person can develop this project, however, it would be convenient for another person to be in charge of the Web part and the DB in order to speed up the project.

Assuming that a person develops it, the costs would be the following::

Table. 2.2.3. Construction of the DB

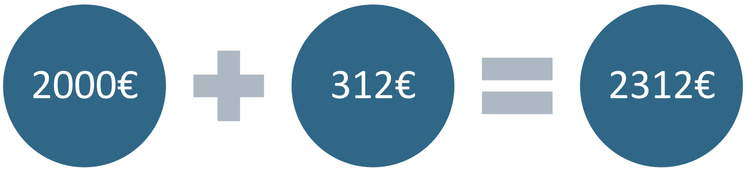
Construction of the DB	Duration	Price	Total
DB creation		104€ / Table	312€
Maintenance	2 h / Month	70€	

The maintenance would be two hours a month, one at the beginning and another in the middle of the month. In this way every 15 days the database is in perfect condition.

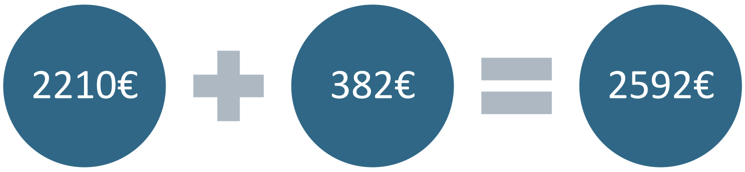
Table. 2.2.4. Construction of the App

Construction of the App	Prece/unity	Total
Creation of the application	250€ / Activity	2000€
Aesthetic color modifications	50€	50€
Icon customization	100€	100€
Maintenance	60€ /Annual	60€
Price with maintenance		2060 - 2210€
Price without maintenance		2000 - 2150€

FINAL PRICE AND SALARY



The price in the worst case would be around 2312 euros (without VAT), if 270 hours are equivalent to 34 days worked full time. The salary would be 68 euros per day, that is, € 8.5 per hour.



The price in the best case would be around 2592 euros (without VAT). Then the salary would be € 9.5 / hour, leaving an average of € 9 / hour.

SYSTEM ANALYSIS AND DESIGN

This chapter presents the requirements analysis, design and architecture of the proposed work, as well as the design of the interface and the database.

REQUIREMENTS ANALYSIS

We will begin with an analysis of the requirements, both functional and non-functional. First we will describe the different functional requirements and we will analyze them one by one. Then the non-functional requirements are shown, some of them have been imposed by partner.

FUNCTIONAL REQUIREMENTS

The mobile application will allow the following twelve objectives:

1. The system will allow a user to be registered.
2. The system will allow a user to be unsubscribed.
3. The system will allow to create a routine.
4. The system will allow assigning a routine.
5. The system will allow to reassign a routine.
6. The system will allow to delete a routine.
7. The system will allow to know all the user's data.
8. The system will allow to observe the users' pending and finalized routines.
9. The system will allow to check the errors of the routine made by the user.
10. The system will allow to see the exercises available for routines.
11. The system will allow distinguish the routines that have been assigned and those that do not.
12. The system will allow to check which users are online.

Each of them is described below, with their entry and exit and a brief description of what they do exactly.

Entry: Register a user
Output: The database creates a new user in the users table
The application asks the database to create a new user with the user and keys specified in the application.

Entry: Unsubscribe a user
Output: The database removes a user from the users table
The application points to a user and asks the database to remove it from the Users table.

Entry: Create a routine
Output: The database creates a new routine of the routines table
The application asks the database to create a new routine by entering exercises, rest, date, repetitions, series and names specified in the application.

Entry: Assign a routine
Output: The database matches a user with a routine
The application selects a user and a routine and asks the database to create a link between them, allowing the user to perform said routine.

Entry: Reassign a routine
Output: The database puts the field from finished to false
The application asks the database to falsify the finalized field of the selected routine, allowing the user to redo this routine.

Entry: Delete a routine
Output: The database delete a routine from the Tables routines
The application points to a routine and asks the database to remove it from the routines table.

Entry: Know all user data
Output: The database search and show all the available information of that user
The application selects a user and asks the database to search all available information of that user (Errors, Routines, Personal Data).

Entry: Observe the users' pending and finalized routines
Output: The database searches and displays all available routines for that user
The application selects a user and asks the database to search all the available information of the user's routines.

Entry: Check the errors of the routine performed by the user
Output: The database searches and displays all the routines with that user's errors
The application selects a user and asks the database to search all the available information of the routines that have some error of that user.

Entry: See the exercises available for routines
Output: The database searches and shows all the exercises in the table Exercises
The application asks the database to search all and show all the exercises that are in the table.

Entry: Distinguish routines that have been assigned and those that are not
Output: The database searches and shows all the routines
The application asks the database to search and show all the routines created. If the routine is assigned, then the application will mark it with an orange icon.

Entry: Check that users are online
Output: The database searches and displays all users whose name is different from null
The application asks the database to search and show all users with profile. If the user is connected, then the application will mark it with a green circle, but the circle is red.

NON-FUNCTIONAL REQUIREMENTS

The mobile application will be ready to:

1. Being an effective system, allowing to manage and control a large number of users quickly.
2. Being a data retention system, everything that happens in the application is stored in a database, create routines, unsubscribe users, assign routines among others.
3. Being an easy usability system, the structure of the application follows the same as whatsapp (An app that everyone is familiar with).
4. Being a safe system, it was bet on Backendless among other things for its security.
5. Being a system with a certain degree of interoperability, the interfaces are fully understood thanks to the design of its structure.

SYSTEM DESIGN

In this section, the system design is presented through the use of different diagrams [3]. It should be noted that the understanding of the application has been prioritized before the rigorous creation of the diagrams.

CASE USE DIAGRAMS

It is then reflected in the form of use case diagrams to the only actor that can intervene in the application as well as the possible uses of it. First an image is displayed and immediately the elements of the image are described.

PERSONAL TRAINER

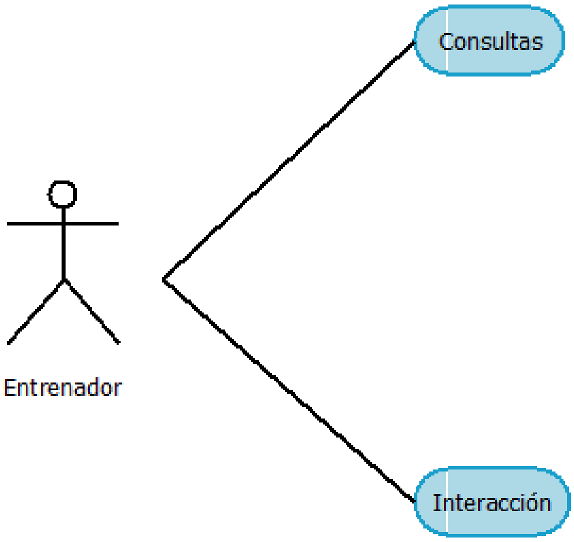


Figure 3.1 Personal Trainer.

The personal trainer (user of the application) can perform two types of interactions with the application. These in turn have been subdivided into two categories:

- **Queries**: All types of actions that show different customer data.

- **Interactions**: Interactions in which the coach believes and sends routines to be performed by the client.

QUERIES

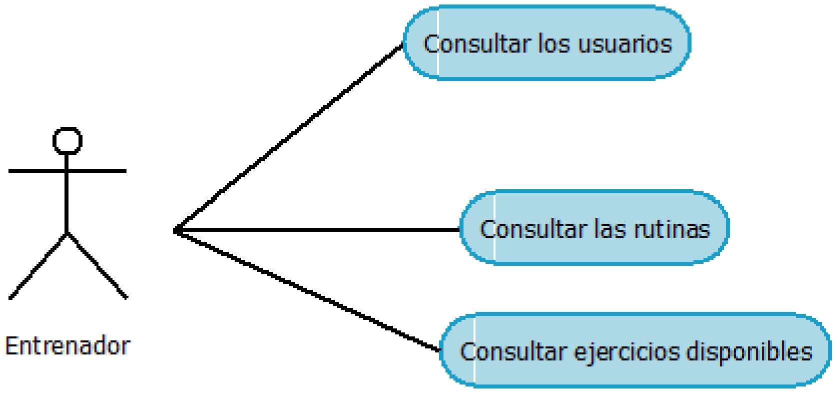


Figure 3.2 Queries.

Consult users: The coach can consult the profile of his users / clients showing only the most interesting information (mistakes made, routines made and to be performed, points obtained ...).

Consult routines: The trainer can consult all the details of the routines that have been created.

Consult available exercises: The trainer can consult the exercises that he has available to create the different routines.

INTERACTIONS

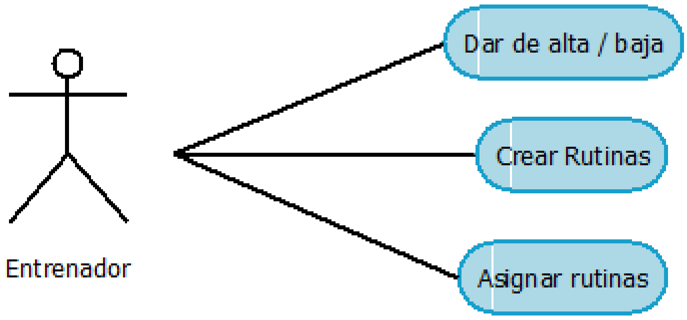


Figure 3.3 Interactions.

Register / unsubscribe: The trainer can register new users and unsubscribe a user if leaves their classes. The abandonment will deprive the user of all routines created by the coach.

Create Routines: The coach can create new routines and these can be deleted.

Assign routines: The coach at any time can both assign and unassign the different routines that have been created.

SERVER

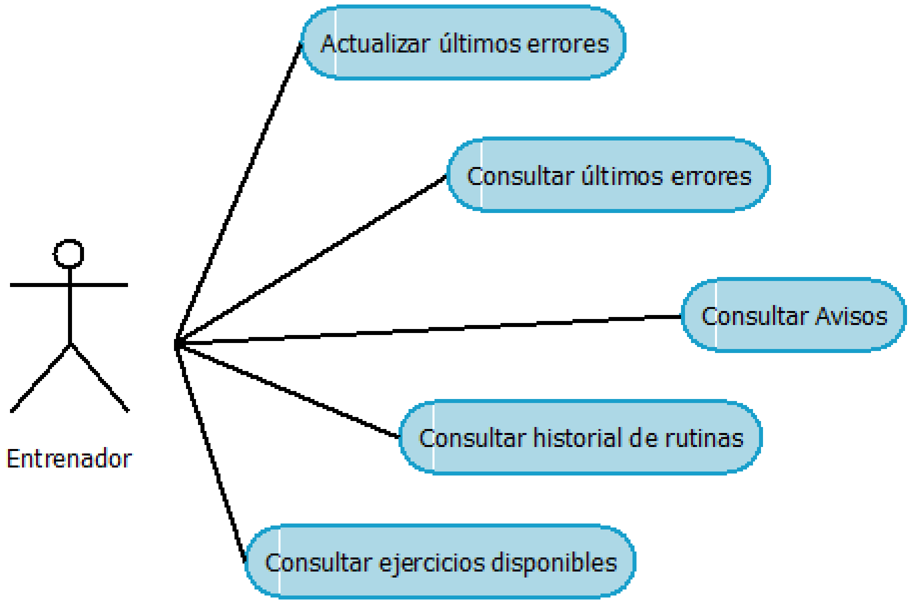

Actualizar últimos errores
Consultar últimos errores
Consultar Avisos
Consultar historial de rutinas
Consultar ejercicios disponibles
Entrenador

Figure 3.4 Server.

Update last errors: The server will receive and store the information of the last errors that will be provided by the users (TFG of the partner).

Check the latest errors: The server will show the coach the information corresponding to the last errors that have been detected.

Consult Notices: The server will list to the trainer the users indicating whether they are online or not.

Query routine history: The server will show a history of all the routines that have been created by the coach.

Consult available exercises: The server will show the exercises that the personal trainer has available.

CLASS DIAGRAMS

This section has been used to show the connection between the different activities, avoiding methods and attributes in search of something more visual. This way of showing the class diagrams complements with the next diagrams quite well and with the previous one..

The green lines indicate the change between activities, if they have an arrow it indicates that it is one way. The orange lines indicate the change of an activity to InformationActivity has been highlighted in this way to facilitate visual analysis since most of the Activities take you here.

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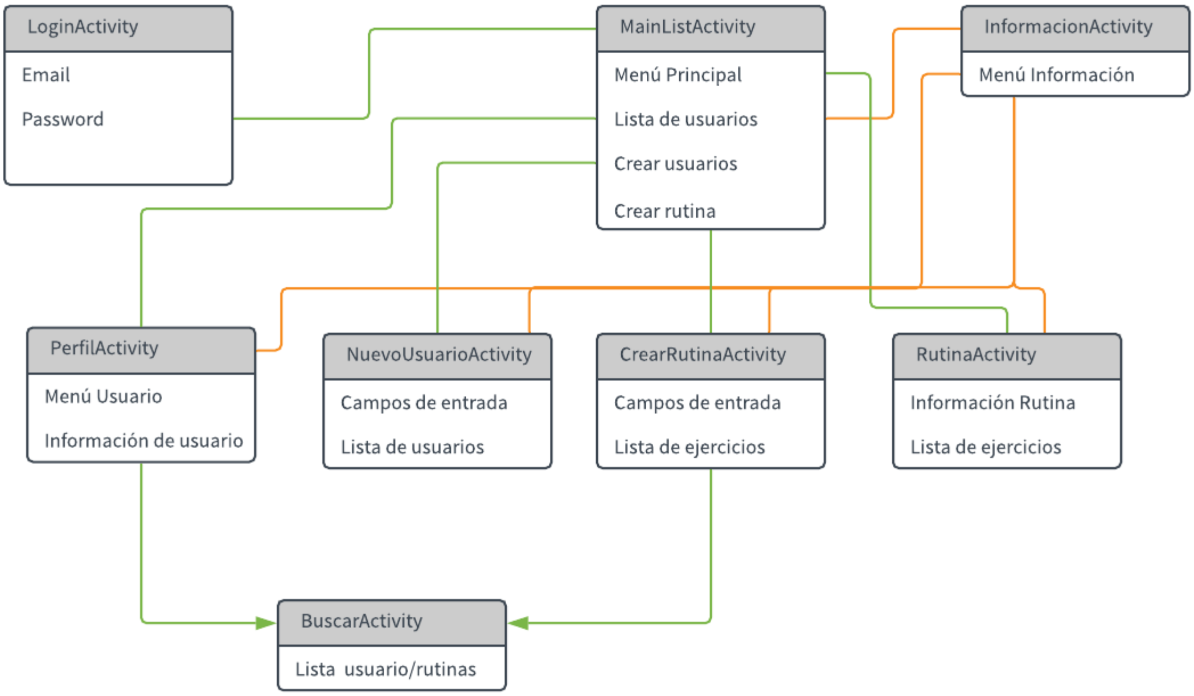


Figure 3.5 Class Diagrams.

ACTIVITIES DIAGRAMS

The following activity diagrams are used to model the behavior of the system through use cases.

SUBSCRIBE USER

The diagram represents the process that the application follows when the coach wants to register a new user. As soon as you start, a screen will appear with the list of actions that the coach can perform.

Once the create user option is selected, a user and a password will be required. At this point the coach will have only two options:

1. Create the user and finish the task.

2. Do not create the user what will take you to the screen with the list of actions.

Later when the user enters for the first time he will be asked to change the password.

Diagrama 1

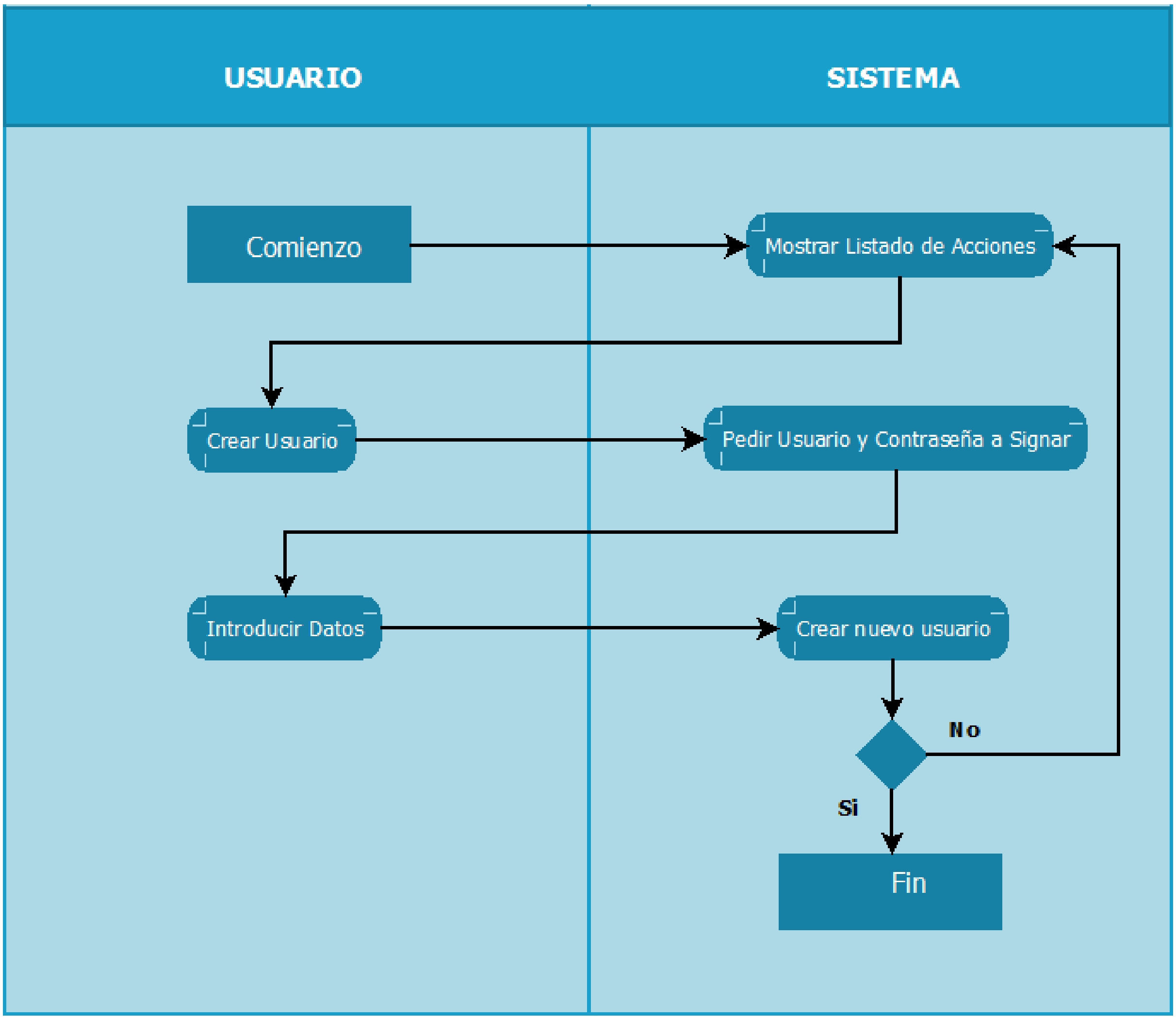


Figure 3.6 Subscribe User.

CREATE ROUTINE

One of the functions of the application will be the creation of routines, this will allow the trainer to perform specific routines for each user.

Once the option to create a routine has been selected, a list of the available exercises will be displayed. The trainer will mark the exercises he wants to be executed and the system will ask him how much time he has to rest and how many repetitions per exercise. Once the different characteristics of the routine have been marked, the system will ask the trainer to enter the completion date and other optional information.

To finish the system will require the coach to confirm the routine, at this point you only have two options:

1. Confirm the routine what will finish the task.

2. Do not confirm the routine which will take you to the screen with the list of actions.

Diagrama 2

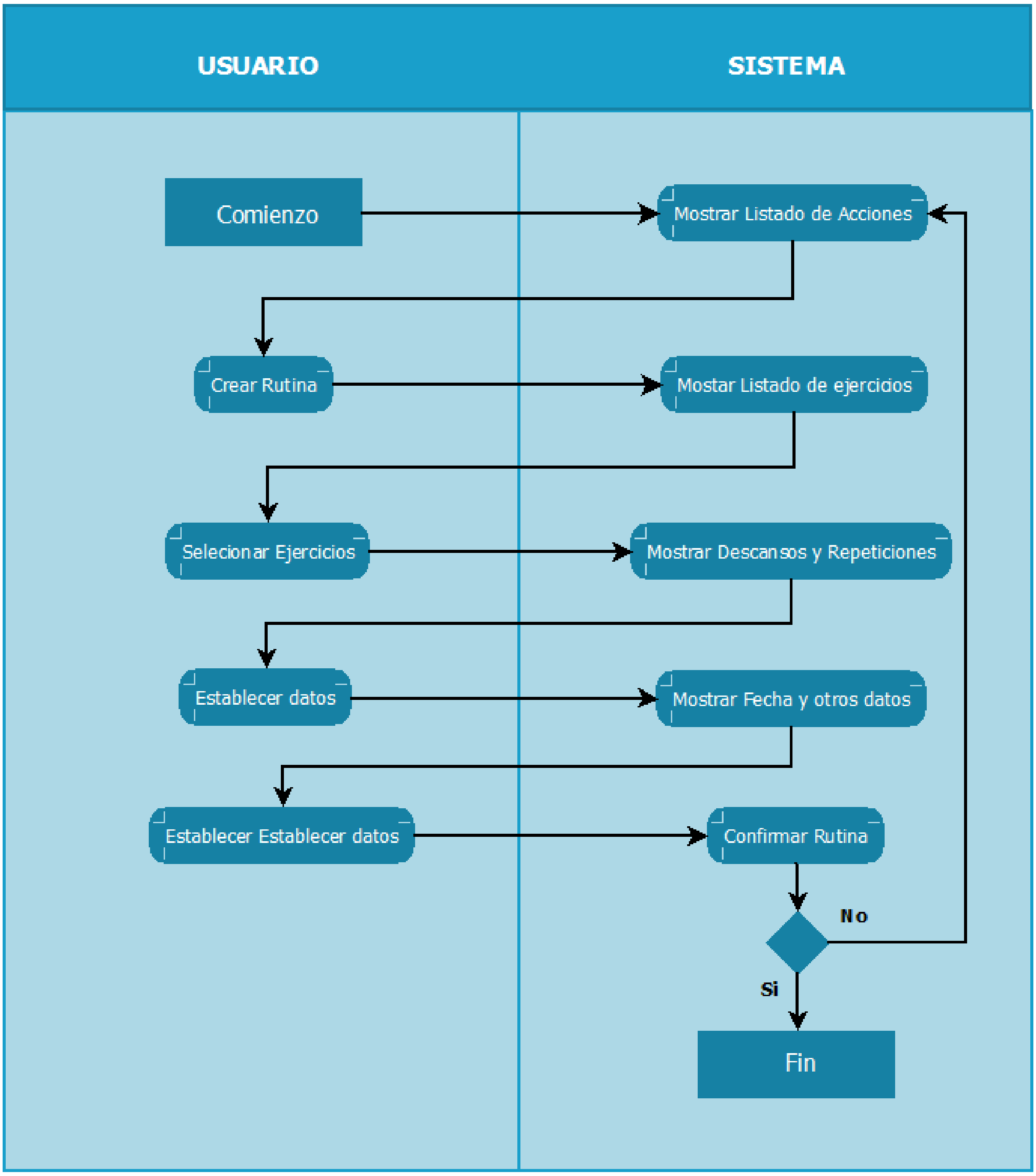

USUARIO
SISTEMA
Comienzo
Mostrar Listado de Acciones
Crear Rutina
Mostar Listado de ejercicios
Selecionar Ejercicios
Mostrar Descansos y Repeticiones
Establecer datos
Mostrar Fecha y otros datos
Establecer Establecer datos
Confirmar Rutina
No
Si
Fin

Figure 3.7 Create Routine.

CONSULT ERROR

The application will also allow you to consult errors and routines, but since the two follow the same scheme, only the activity of checking errors will be counted.

The coach will have to select a user. The system will show the user's summary, the trainer should go to the Errors tab. Where the system will show you the most recent error, once you have finished visualizing the error, you will have two options:

1. Check the following error, where the system will take you to the next error that was committed by the user.

2. Switch tab or exit user menu.

Diagrama 3

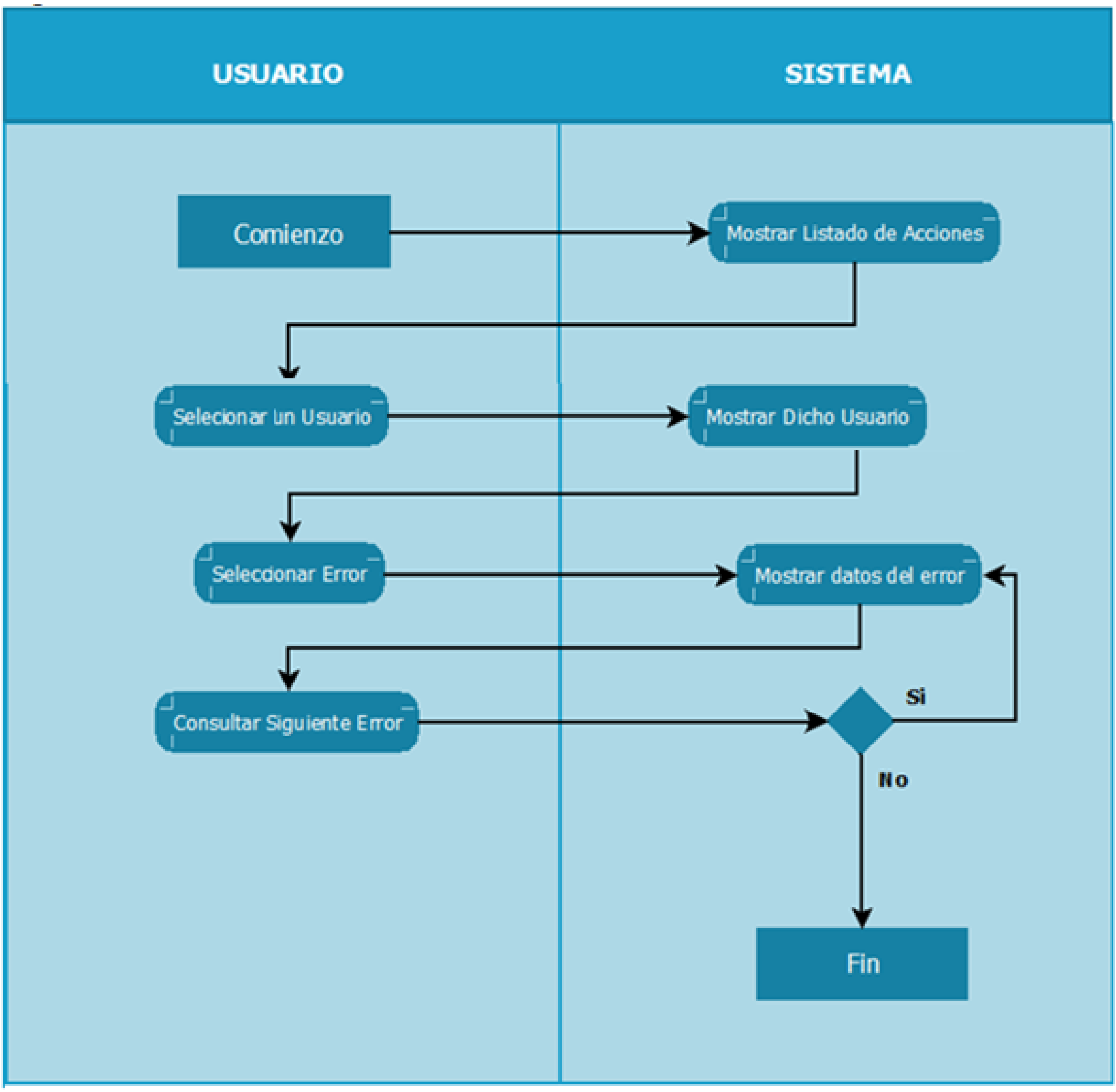


Figure 3.8 Consult Error.

ASSIGN ROUTINES

The last of the functions will be to assign routines, the routines can be assigned only to a user. When this happens, the users of the coaches will see such routines available in the video game.

The coach must select the option to consult users, the system will show the list of users. Once the coach chooses the user, the system will send him to a screen with the user's profile. Once there, the trainer will have to press the routine tab and press the button to assign a new routine and the system will respond with a list of routines. Once here, there will only be two options:

1. Select the routine that will complete the task.

2. Do not select the routine which will take you to the routine tab.

Diagrama 4

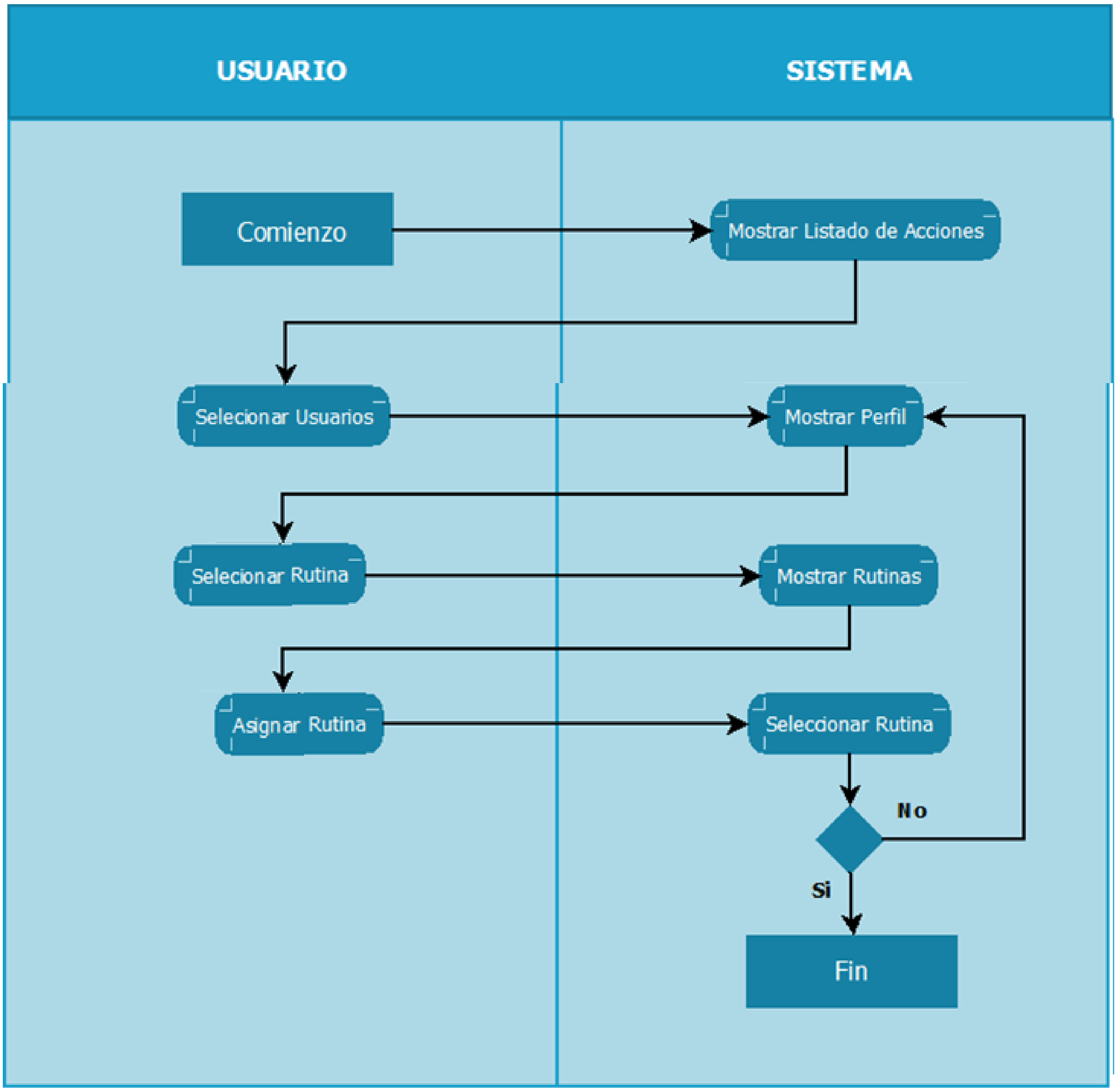


Figure 3.9 Assign Routines.

INTERACTION DIAGRAMS.

Interaction diagrams show several scenarios of use cases, log in, register a user, show the data of a routine ... In these, the interaction between the set of objects is shown: Trainer, System and Database that cooperate in the realization of said scenarios.

LOGIN

The first iteration suffered by the user is the login, where you must fill in the e-mail and password fields. Once this is done, the system asks the DB if the information is correct.

- **If the information is incorrect**: The DB notifies the system and it issues an error message, depending on the error, one message or another appears.

- **If the information is correct**: The DB notifies the system and the user goes to the main menu, users tab..

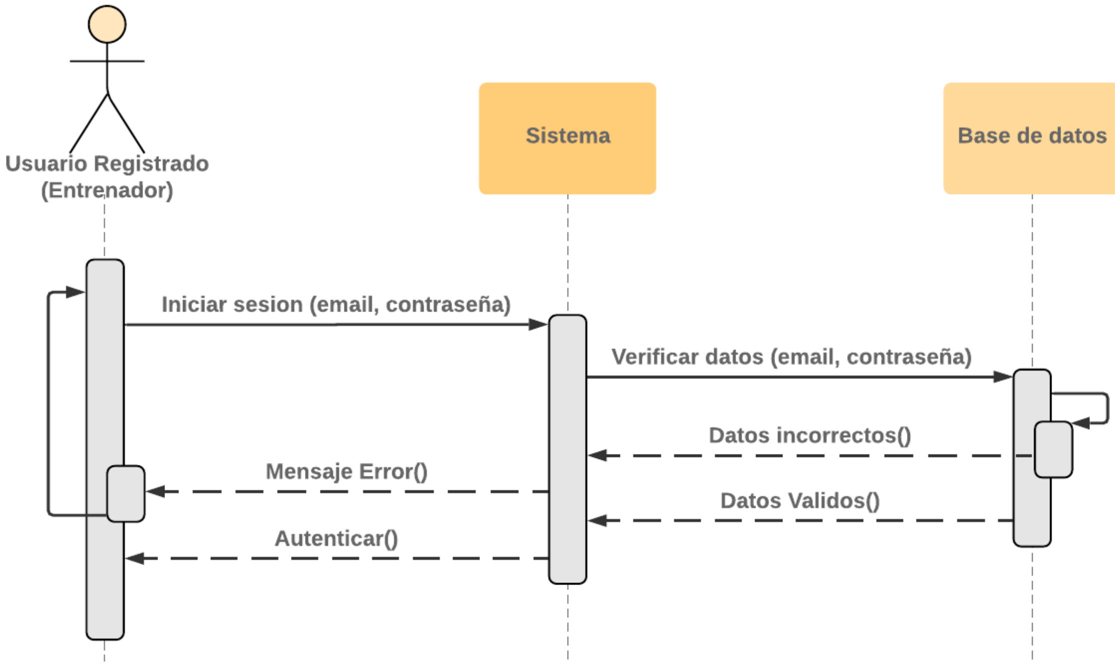

Usuario Registrado (Entrenador)
Sistema
Base de datos
Iniciar sesion (email, contraseña)
Verificar datos (email, contraseña)
Datos incorrectos()
Mensaje Error()
Datos Validos()
Autenticar()

Figure 3.10 Login.

The error messages indicate the problem that is happening, if the entered data is erroneous or if some filling field is missing.

REGISTER A USER

Once you are in the users tab, the coach must press the add user button . The system automatically asks the DB to show all the users. Once the system has the information, it generates the screen and fills in the list of users. The trainer must insert a user and a password and press the finish button . Again the system asks the database to verify the uniqueness, resulting in two possible values:

- **Erroneous uniqueness**: the user is not created in the database.
- **Correct uniqueness**: the system is informed and the user is created in the database. The system also updates the list of users on the screen.

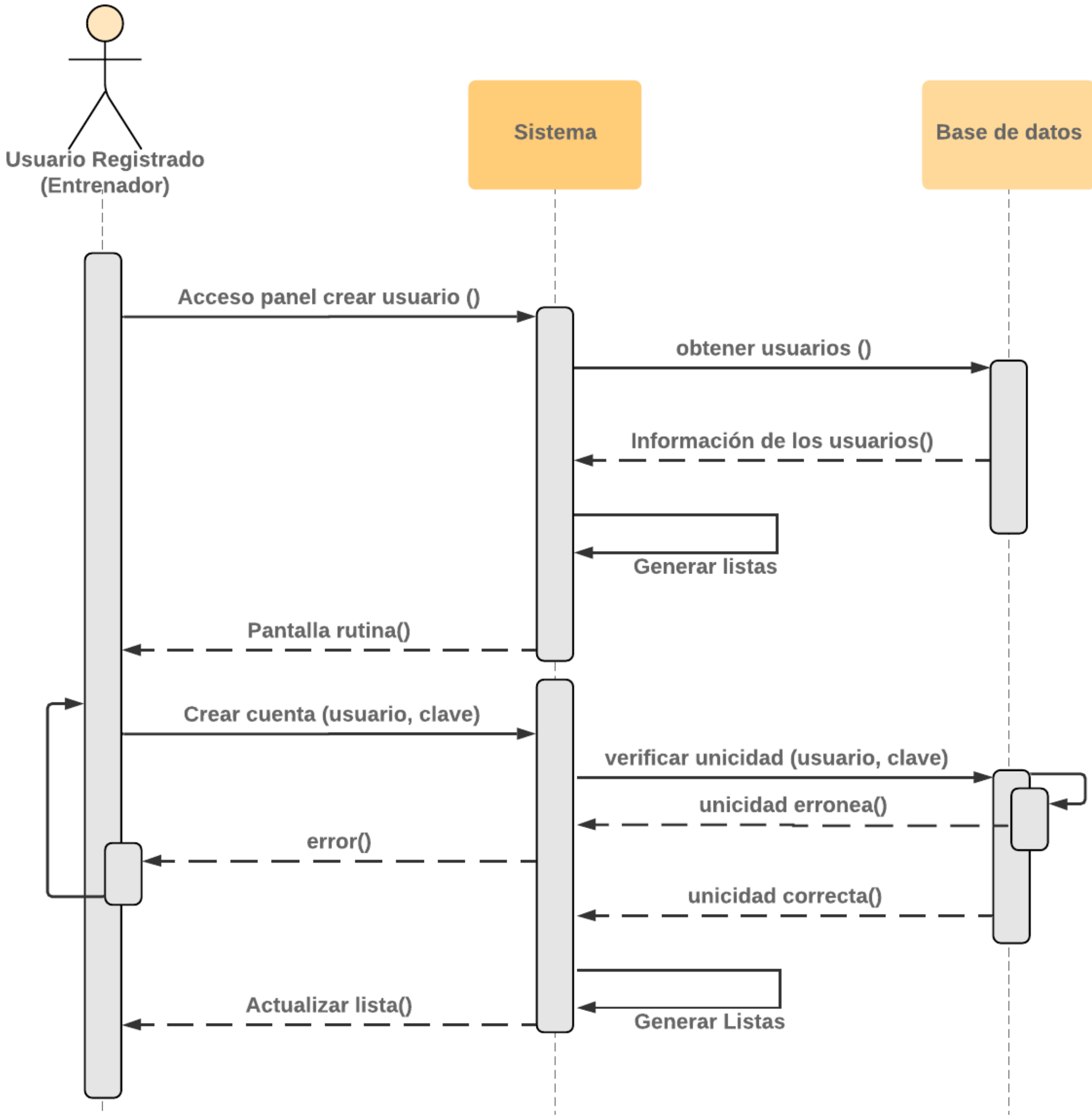

Usuario Registrado (Entrenador)
Sistema
Base de datos
Acceso panel crear usuario ()
obtener usuarios ()
Información de los usuarios()
Generar listas
Pantalla rutina()
Crear cuenta (usuario, clave)
verificar unicidad (usuario, clave)
unicidad erronea()
error()
unicidad correcta()
Actualizar lista()
Generar Listas

Figure 3.11 Register User.

This procedure is very similar to the one used to create the routines, that's why these diagrams are not shown.

SHOW THE DATA OF A ROUTINE

Once you are in the users tab, the trainer should press the Routines tab or drag the finger to the left. The system automatically asks the DB to show all the routines, once the system has the information, generates the screen with the list of routines.

The personal trainer selects a routine from the list and the system asks the database to obtain the information of that routine along with the exercises associated with it. Once the system has the data, the routine screen shows it and generates the list of exercises.

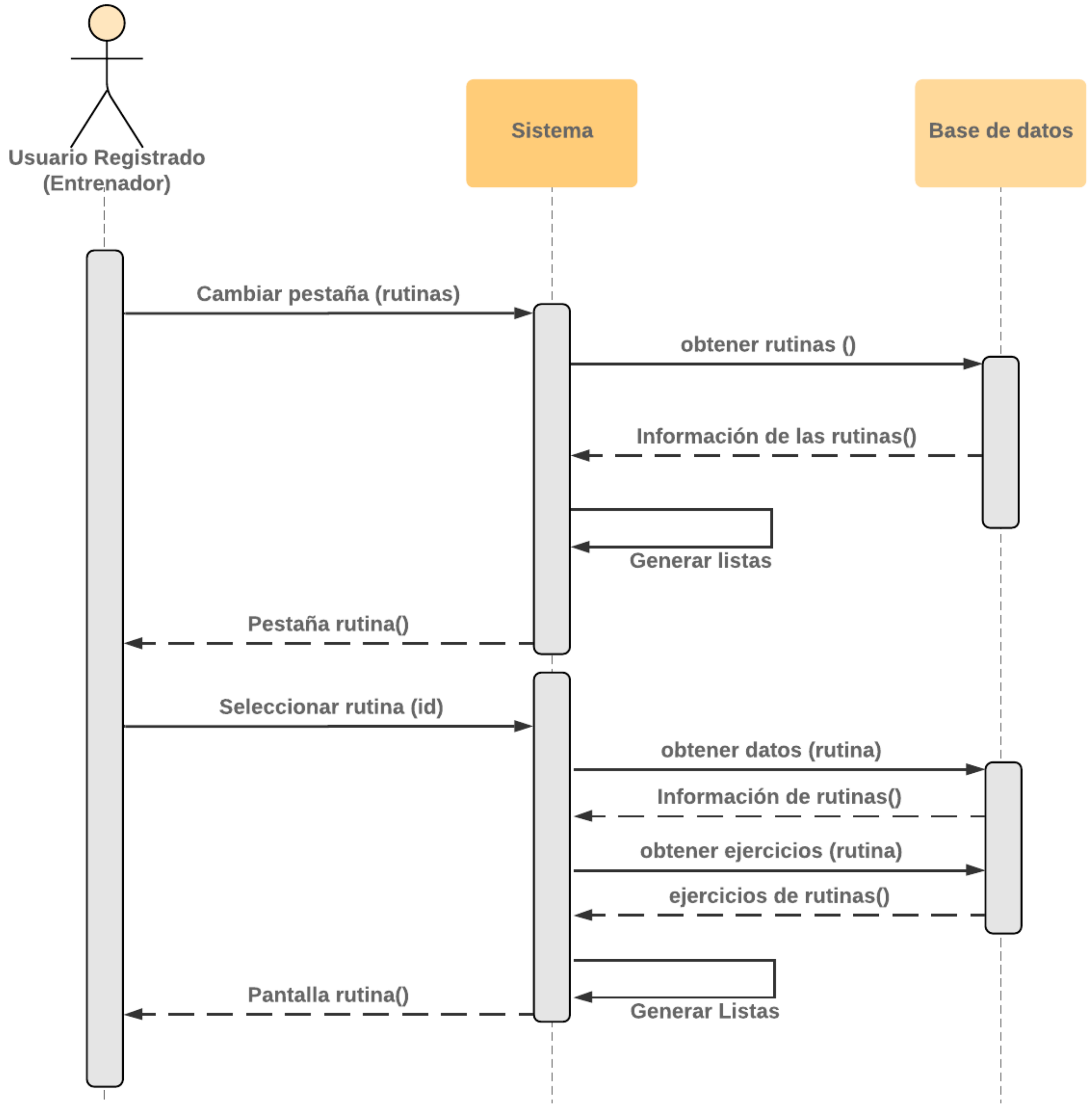


Figure 3.12 Show The Data Of A Routine.

The first part of the procedure is also used to show the list of exercises, that's is why those diagrams are not shown.

SEE A USER'S ROUTINES

Once in the users tab, the coach must select a user from the list. The system automatically asks the DB to show all the user information, once the system has the information, it generates the profile screen in the summary tab.

The personal trainer selects the routine tab and the system asks the database to obtain the information of the user's routines. When the system has the data, it shows the routines tab and generates the pending routines lists and finished routines lists.

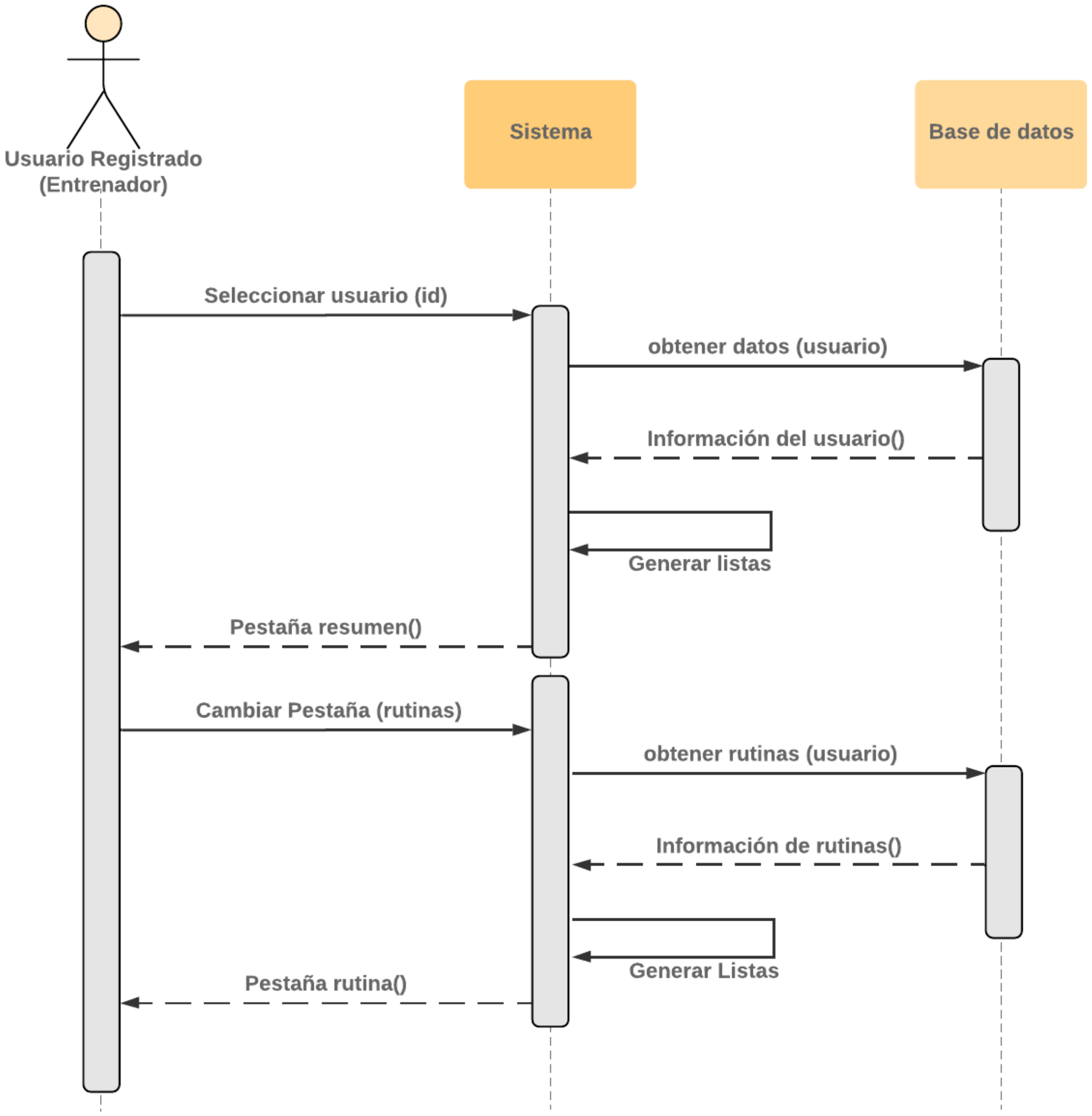


Figure 3.13 See A User's Routines.

This procedure is very similar to the one used to show errors, profile and summary, that's is why those diagrams are not shown.

SHOW INFORMATION

The coach must press the information button ❗ that is in the application bar. Then the system that has the information data stored shows the screen.

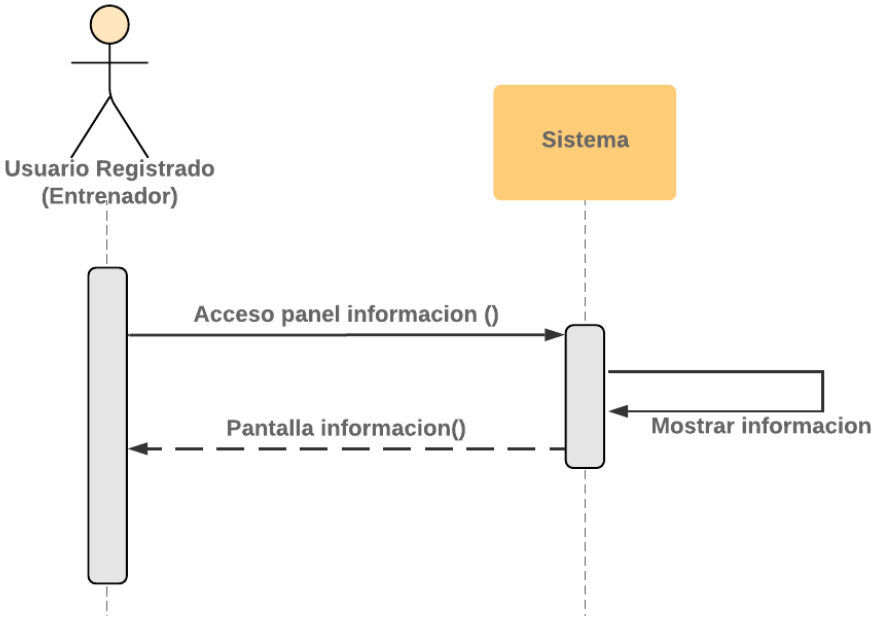


Figure 3.14 Show Information.

This screen can be accessed from anywhere, except when we perform a search. It is also the only screen that does not require a query to the DB.

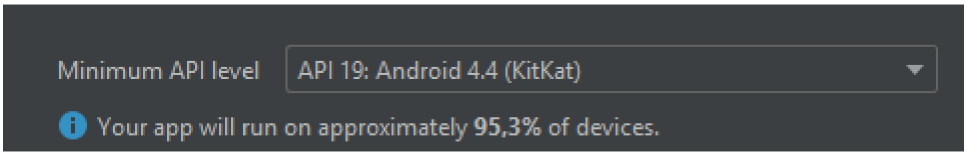
SYSTEM ARCHITECTURE

This section describes the architecture of the system, that is, the hardware and software requirements, the interconnection of components and the benefits of using a "backend as a Service" platform".

HARDWARE AND SOFTWARE REQUIREMENTS

In order to use this application it is necessary to have a mobile, internet connection and the application. The mobile must have at least the operating system Android 4.4 (KitKat), any mobile with this system can run the application.

Approximately 95% of users with android can run it.



Minimum API level: API 19: Android 4.4 (KitKat)

Your app will run on approximately **95,3%** of devices.

Figure 3.15 Software Requirements.

The Internet connection is not a problem because nowadays everyone has their mobile phones and the trend now is that more and more people have unlimited data. In the case of the application, in the future you can get through Google Play for free.

INTERCONNECTION OF COMPONENTS

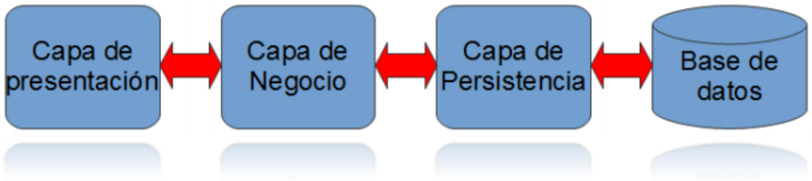


Figure 3.16 Interconnection Of Components.

Presentation layer: is the one that the user sees, presents the system to the user, communicates the information and captures the user's information in a minimum of process. It has the characteristic of being "friendly" (understandable and easy to use) for the user. This layer communicates only with the business layer. This layer is composed of a set of files in XML format (the standard format for the design of interfaces in Android).

Business layer: where the programs that are executed reside, the user's requests are received and the answers are sent after the process, this is where all the rules that must be fulfilled are established. This layer communicates with the presentation layer, to receive the requests and present the results, and with the persistence layer, to request the database manager to store or retrieve data from it. Some security measures are presented here, as is the case of checking entry fields.

Persistence layer: is the layer responsible for providing a library of functionalities for accessing the database, where the data resides. It is formed by one or more database managers who perform all data storage, receive requests for storage or retrieval of information from the business layer.

Database: is the electronic file system that stores information and are organized by fields, records and files. This way you can quickly select the pieces of data you need and send them to the Persistence Layer. In this case, the security of the Database is delegated to the Backendless service. This model provides a series of services (cloud storage, realtime, authentication ...) allowing to completely dispense a personalized api.

BENEFITS OF USING A "BACKEND AS A SERVICE" PLATFORM

They offer a **storage system in the cloud**, so you do not need maintenance and database optimization, you just have to adapt to the service offered.

You do not need the **costs of an application server**, since you do not have to invest in infrastructure and engineering to make a great architecture.

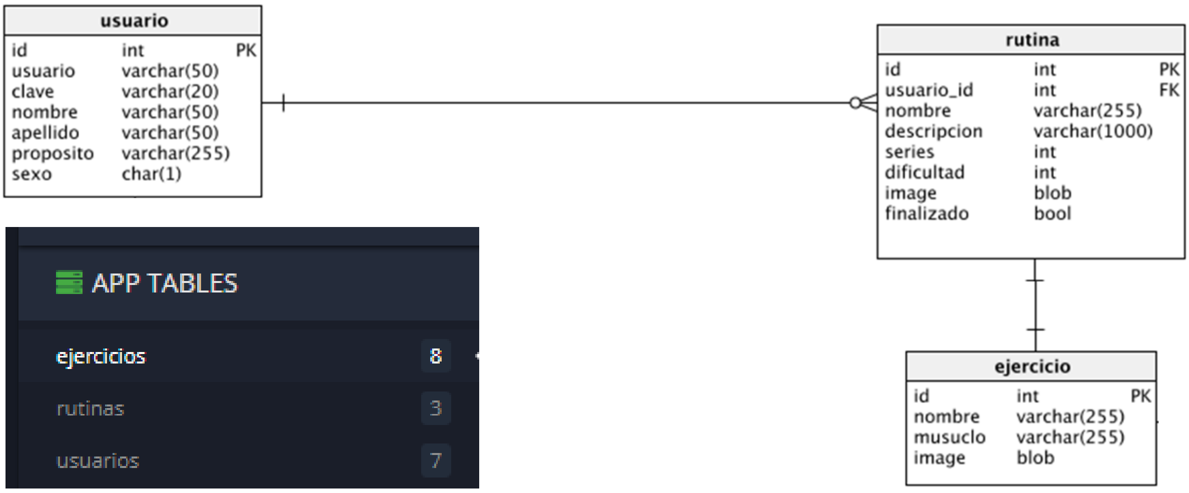
The main BaaS services have **libraries** on both the client side and the server side, which makes integration much easier

These services usually provide a **management dashboard** quite usable and comfortable for anyone to manage them, in addition to providing **statistics** and useful information about the consumption of your app.

Some providers offer **realtime** functionalities to provide their information, so we can simply develop functionalities such as chats, videogames.

DESIGN OF THE DATABASE WITH BACKENDLESS

The use of this service changes the previously designed DB, now it saves the different exercises, such as the different routines that the coach can generate. Some personal information of the trainer's clients will also be saved, such as sex, motivation, purpose and, of course, any mistakes they may make. There will be a specific table for the exercises, another for the routines and one for the users.



usuario		
id	int	PK
usuario	varchar(50)	
clave	varchar(20)	
nombre	varchar(50)	
apellido	varchar(50)	
proposito	varchar(255)	
sexo	char(1)	

rutina		
id	int	PK
usuario_id	int	FK
nombre	varchar(255)	
descripcion	varchar(1000)	
series	int	
dificultad	int	
image	blob	
finalizado	bool	

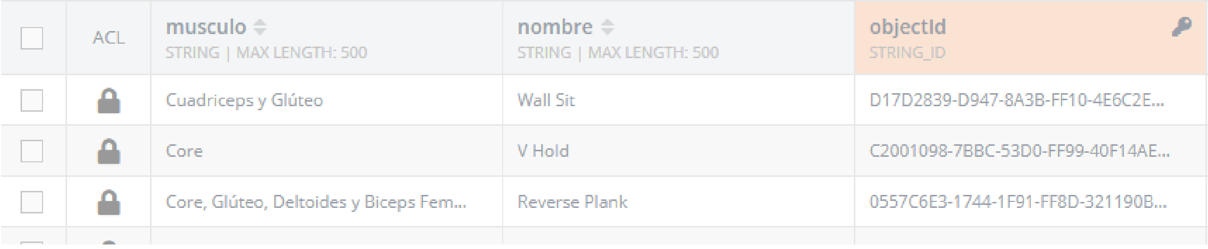
ejercicio		
id	int	PK
nombre	varchar(255)	
musculo	varchar(255)	
image	blob	

APP TABLES

ejercicios	8
rutinas	3
usuarios	7

Figure 3.17 Design Of The Database

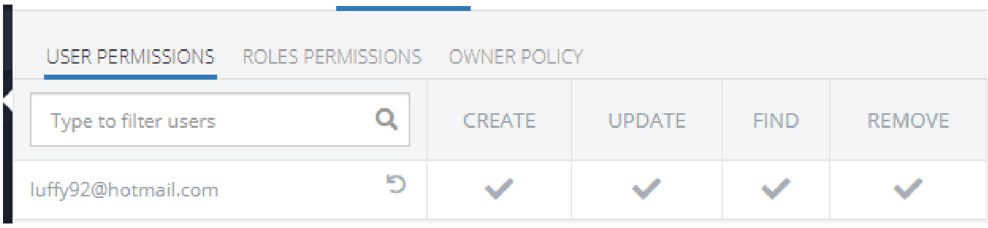
In this case and to simplify it has been chosen to store only the data of greatest interest to perform this TFG. That is why these data could be added other data to have a more complete description of the exercises, routines, users, errors, etc.



☐	ACL	musculo STRING | MAX LENGTH: 500	nombre STRING | MAX LENGTH: 500	objectId STRING_ID
☐	🔒	Cuadriceps y Glúteo	Wall Sit	D17D2839-D947-8A3B-FF10-4E6C2E...
☐	🔒	Core	V Hold	C2001098-7BBC-53D0-FF99-40F14AE...
☐	🔒	Core, Glúteo, Deltoides y Biceps Fem...	Reverse Plank	0557C6E3-1744-1F91-FF8D-321190B...

Figure 3.18 Table Of The Database

This type of service also greatly facilitates the management of coaches, being able to assign different roles to create a hierarchical structure within a specific gym. In addition to being able to change the different permissions in a very comfortable way.



USER PERMISSIONS ROLES PERMISSIONS OWNER POLICY

Type to filter users	CREATE	UPDATE	FIND	REMOVE
luffy92@hotmail.com	✓	✓	✓	✓

Figure 3.19 User Permissions

INTERFACE DESIGN

Below is the interface of the different screens of the application.

LOGIN

The first thing you see is the name and logo of the application.

This screen has:

- Two entry fields (E-mail and Password)
- A button to login.
- A message that appears when a logeo error occurs.

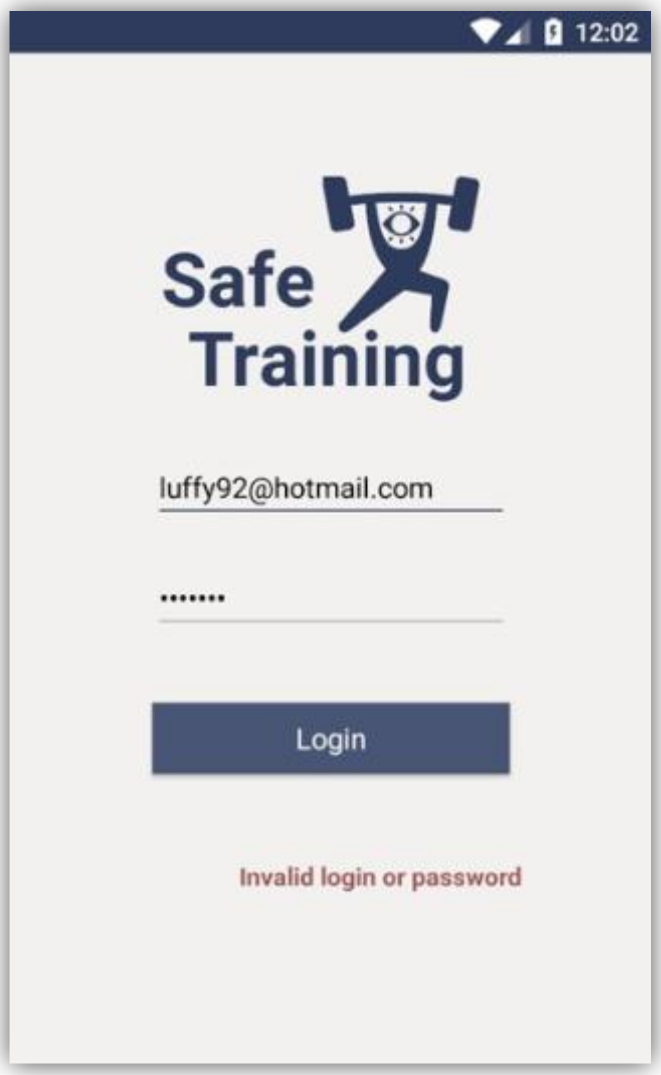


Figure 3.20 Login

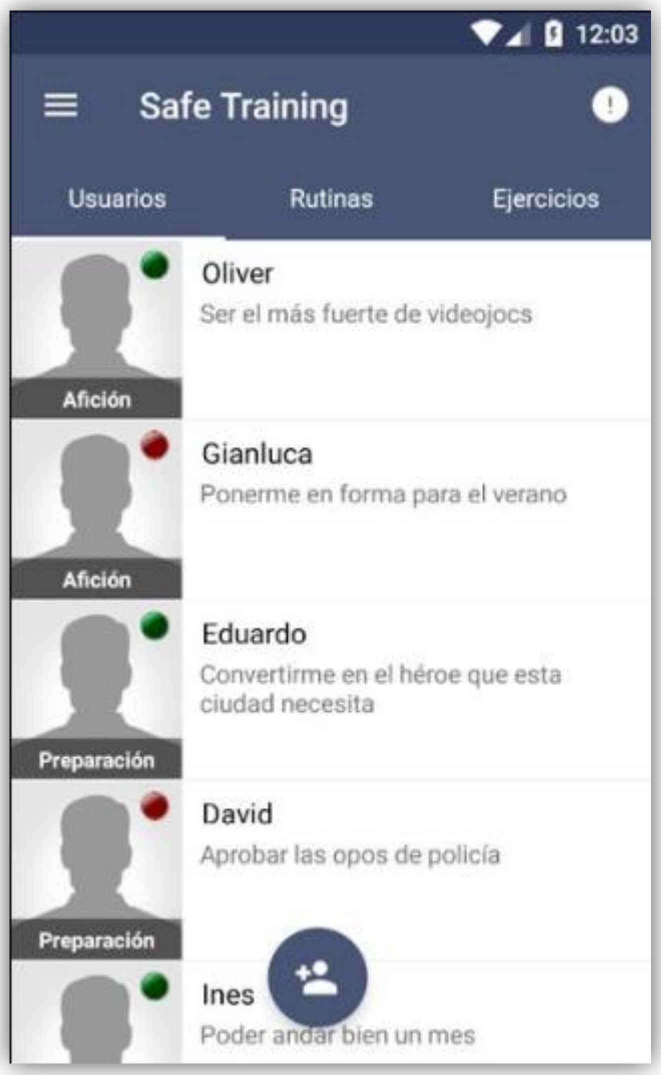
* It's not possible to sign up directly from the application. For that purpose the coach has to ask for permission from the app owner.

MAIN MENU - USERS

The first thing you see is a menu, this is the main menu of the application and is based on the logic of whatsapp. This makes the understanding of the app much easier, which will be quite familiar and comfortable to use.

This screen has:

- The application bar where you can leave the session or enter the information screen
- The main menu that is divided into three (Users, Routines and Exercises).
- A list of users where the name, purpose, motivation and status of the users are displayed.
- A button to register a new user.



Oliver
Ser el más fuerte de videojocs
Afición

Gianluca
Ponerme en forma para el verano
Afición

Eduardo
Convertirme en el héroe que esta ciudad necesita
Preparación

David
Aprobar las opos de policía
Preparación

Ines
Poder andar bien un mes

Figure 3.21 Users

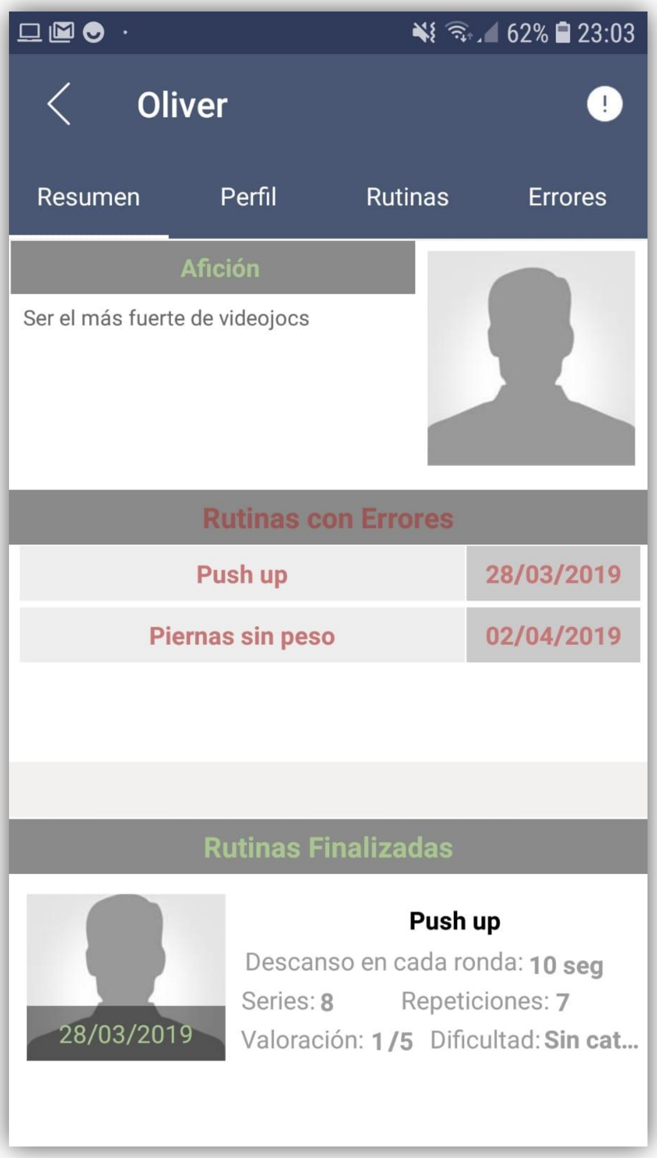
* To appear in this list it is necessary to have logged in and entered personal information.

MENU USERS - SUMMARY

The first thing you see when selecting a user is a menu, this is the user menu of the application and it is also based on WhatsApp logic.

This screen has:

- The application bar where we you go back to the previous screen or enter the information screen.
- The main menu that is divided into 4 (Summary, Profile, Routines and Errors).
- A section for information.
- A list of errors showing the name of the routine and the date.
- A list where the routines completed by the user are displayed.



Afición

Ser el más fuerte de videojocs

Rutinas con Errores

Push up	28/03/2019
Piernas sin peso	02/04/2019

Rutinas Finalizadas

28/03/2019

Push up

Descanso en cada ronda: 10 seg

Series: 8 Repeticiones: 7

Valoración: 1 /5 Dificultad: Sin cat...

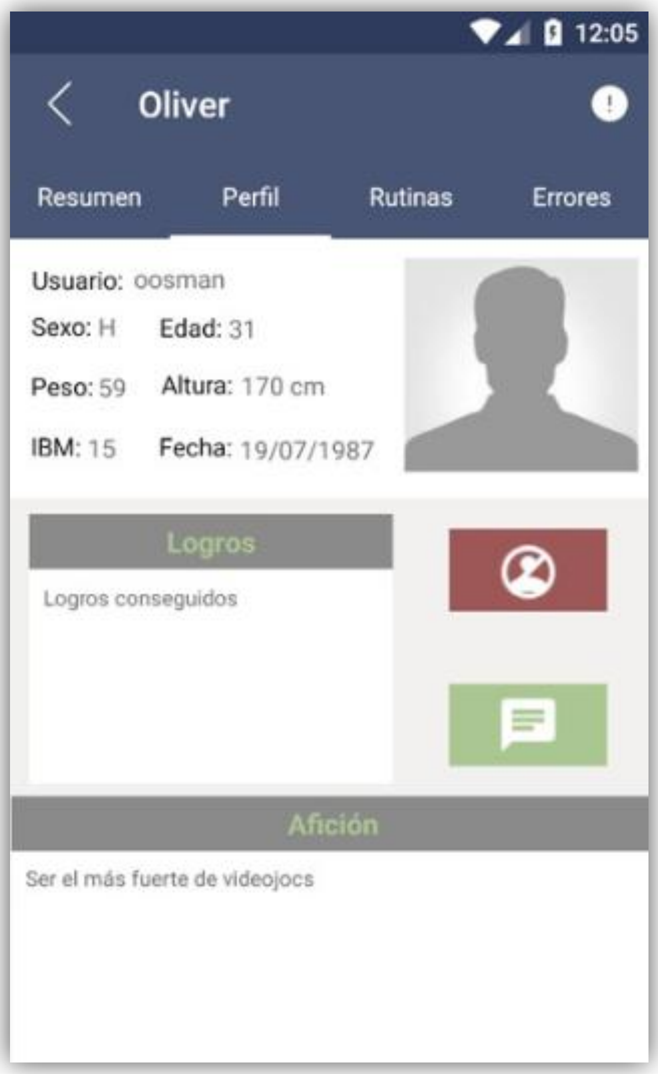
Figure 3.22 Summary

MENU USERS - PROFILE

This tab is the profile tab, belongs to the users menu and shows all the user's personal information.

This screen has:

- The application bar where you can return to the previous screen or enter the information screen.
- The main menu that is divided into 4 (Summary, Profile, Routines and Errors).
- A section for information and achievements.
- A button to delete a user, if the user is confirmed the user will be deleted from the database.
- A button to contact the user (future work) by message or call.



Usuario: oosman

Sexo: H Edad: 31

Peso: 59 Altura: 170 cm

IBM: 15 Fecha: 19/07/1987

Logros

Logros conseguidos

Afición

Ser el más fuerte de videojocs

Figure 3.23 Profile

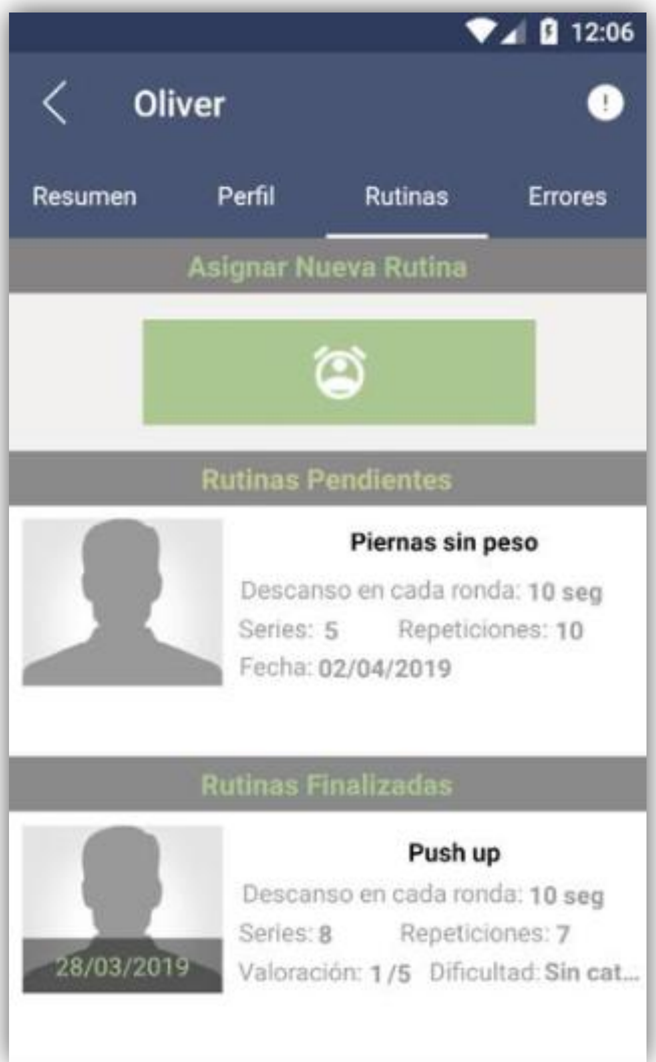
* The information of achievements is not in the planning (**future work that does not fall within the planning of the TFG**).

MENU USERS - ROUTINES

This tab is the Routines tab, belongs to the users menu and shows all the routines assigned to the user.

This screen has:

- The application bar where you can go back to the previous screen or enter the information screen.
- The main menu that is divided into 4 (Summary, Profile, Routines and Errors).
- A button to assign routines.
- A list that shows the pending routines: the ones they are assigned to but not completed yet.
- A list that shows the finished routines: the ones that they are assigned to and have completed.



Piernas sin peso

Descanso en cada ronda: 10 seg

Series: 5 Repeticiones: 10

Fecha: 02/04/2019

Push up

Descanso en cada ronda: 10 seg

Series: 8 Repeticiones: 7

Valoración: 1 /5 Dificultad: Sin cat...

Figure 3.24 User Routines

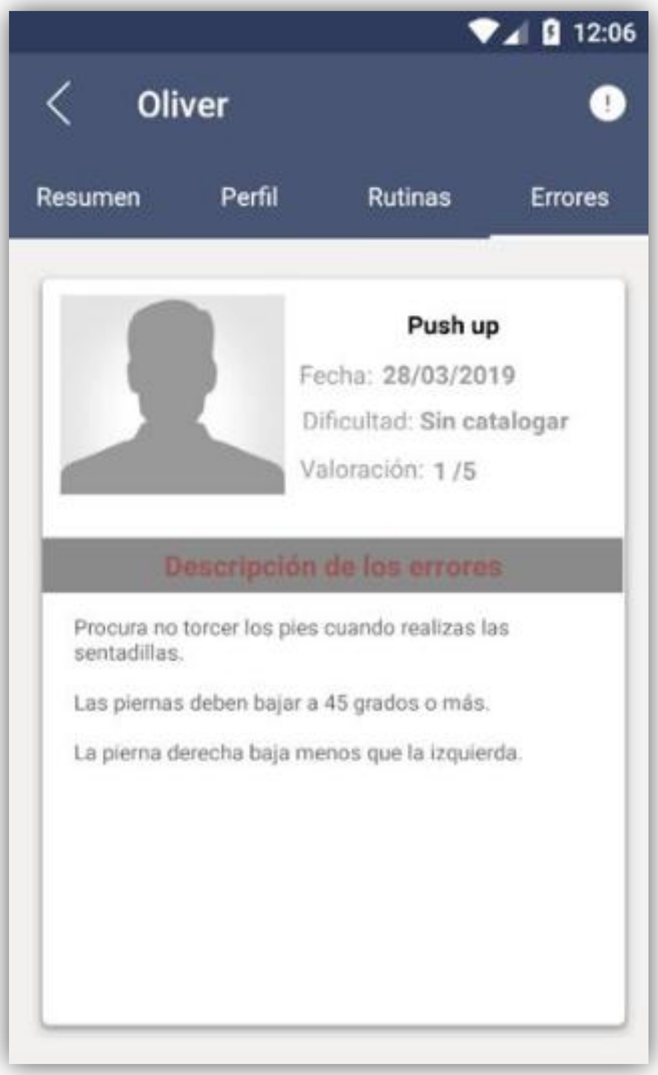
* If you click on a finished routine, the system gives you the option to reassign it.

MENU USERS - ERRORS

This tab is the Errors tab, belongs to the users menu and shows the routines where the user has made an error.

This screen has:

- The application bar where you can go back to the previous screen or enter the information screen.
- The main menu that is divided into 4 (Summary, Profile, Routines and Errors).
- A list in the form of Card View, showing the name of the routine, the user's feedback and the description of the errors.



Push up

Fecha: 28/03/2019

Dificultad: Sin catalogar

Valoración: 1 /5

Descripción de los errores

Procura no torcer los pies cuando realizas las sentadillas.

Las piernas deben bajar a 45 grados o más.

La pierna derecha baja menos que la izquierda.

Figure 3.25 Errors

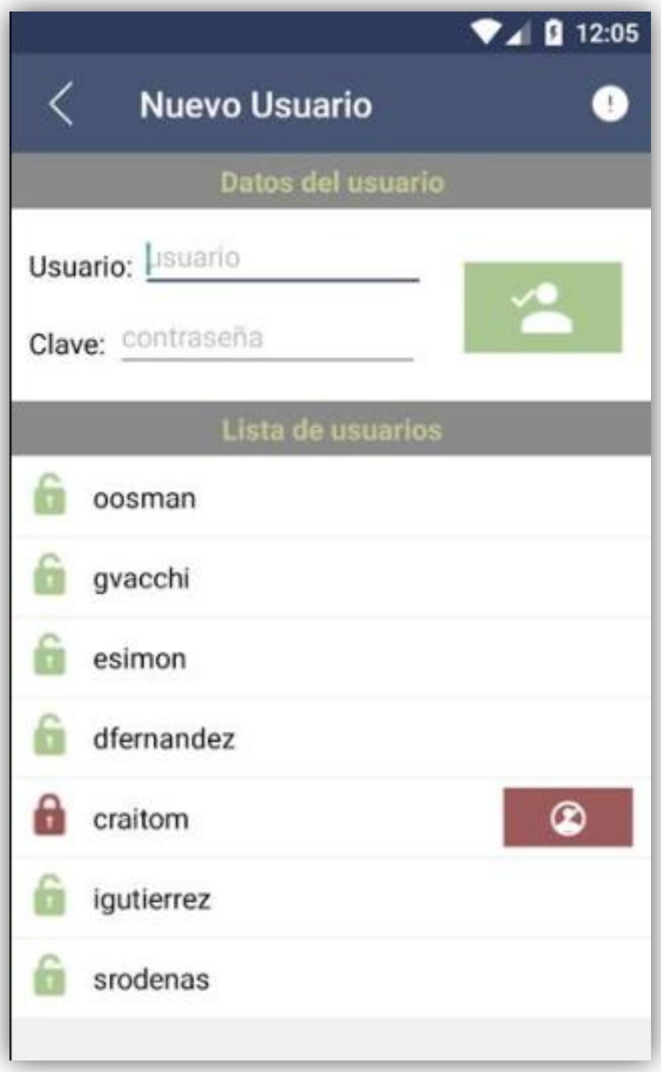
* To change the routine we must click on the routine and drag the finger a little down and then to the left.

CREATE NEW USER

To access this screen you must press the new user button in the users tab of the main menu.

This screen has:

- The application bar where you can go back to the previous screen or enter the information screen.
- Two entry fields (User and Password).
- A button to complete registration , if any of the fields fails a new user is not created.
- A list of all users, even those who have never logged in.



12:05

Nuevo Usuario

Datos del usuario

Usuario: usuario

Clave: contraseña

Lista de usuarios

- oosman
- gvacchi
- esimon
- dfernandez
- craitom
- igutierrez
- srodenas

Figure 3.26 New User

* The red padlock means that the user has never logged in, in this list you can delete them.

MAIN MENU - ROUTINES

The Routines tab is the second tab of the main menu, this is the place where routines are created and displayed.

This screen has:

- The application bar where you can leave the session or enter the information screen.
- The main menu that is divided into three (Users, Routines and Exercises).
- A list of routines where the name is displayed and if it is assigned to a user or not.
- A button to create a new routine ⏰ .

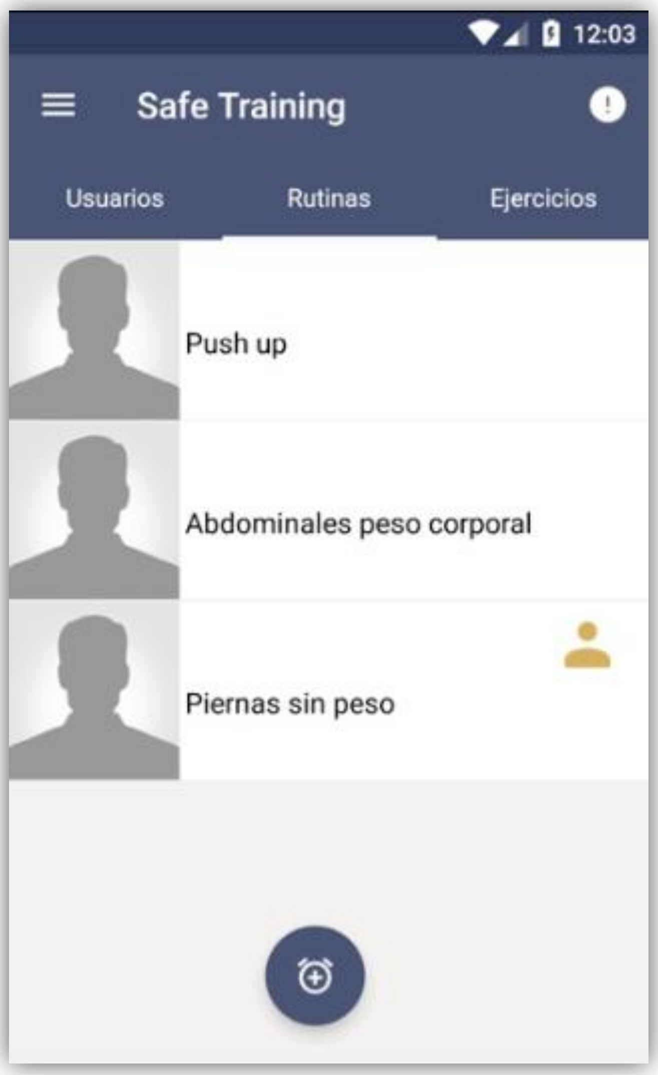


Figure 3.27 All Routines

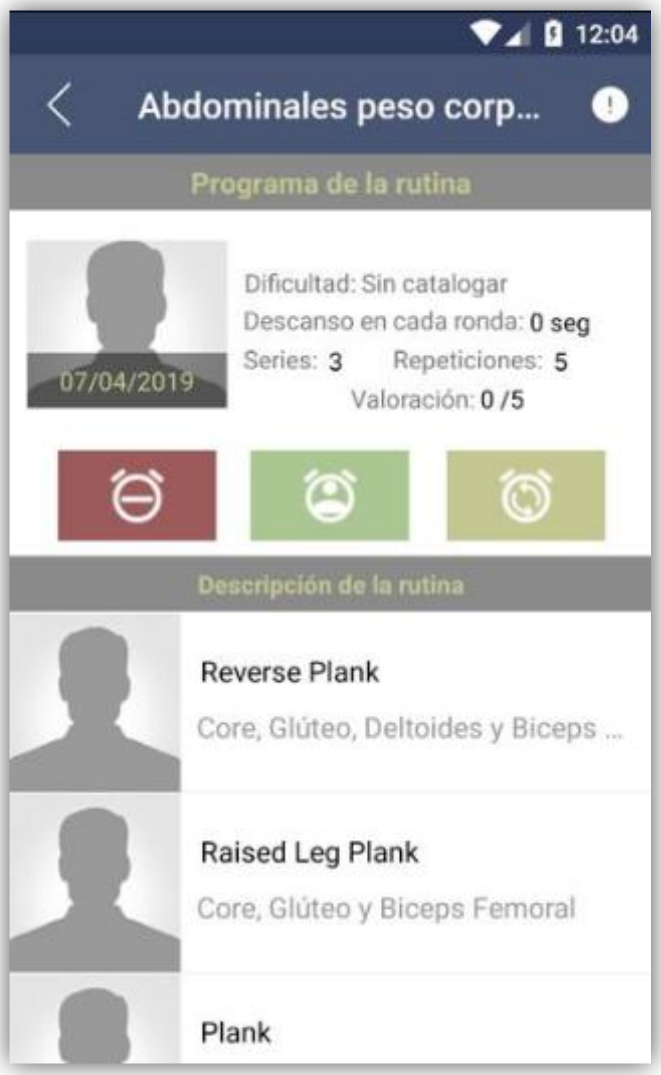
* The orange icon means that the routine is assigned to a user.

ROUTINE DESCRIPTION

To access this screen you must select a routine from the list that is in the routine tab of the main menu.

This screen has:

- The application bar where you can go back to the previous screen or enter the information screen.
- Three buttons: Remove routine , assign routine and reassign routine respectively.
- A section for routine information.
- A list of the exercises assigned to the routine.



12:04

Abdominales peso corp...

Programa de la rutina

07/04/2019

Dificultad: Sin catalogar

Descanso en cada ronda: 0 seg

Series: 3 Repeticiones: 5

Valoración: 0 /5

Descripción de la rutina

Reverse Plank

Core, Glúteo, Deltoides y Biceps ...

Raised Leg Plank

Core, Glúteo y Biceps Femoral

Plank

Figure 3.28 Routine Description

* If the routine is assigned, the assign button is changed to the unassign button .

CREATE A NEW ROUTINE

To access this screen you must press the create routine button in the routine tab of the main menu.

This screen has:

- The application bar where you can go back to the previous screen or enter the information screen.
- Five input fields (Name, Date, Rest, Repetitions, Series).
- A button to complete routine , if any of the fields fails, a new routine is not created.
- A list of all available exercises.

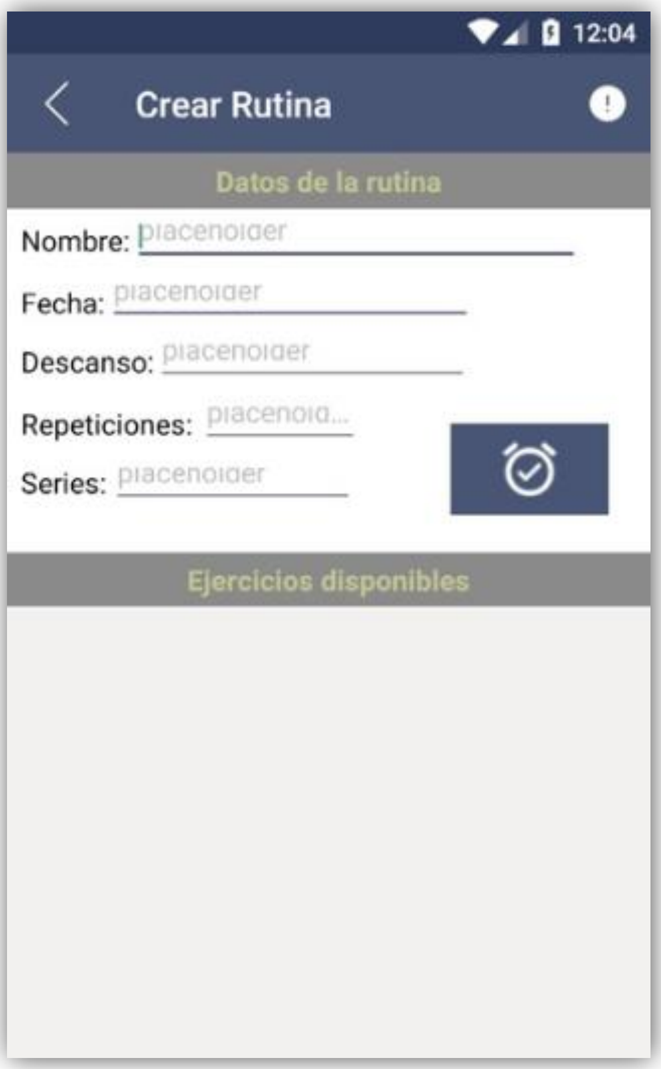


Figure 3.29 New Routine

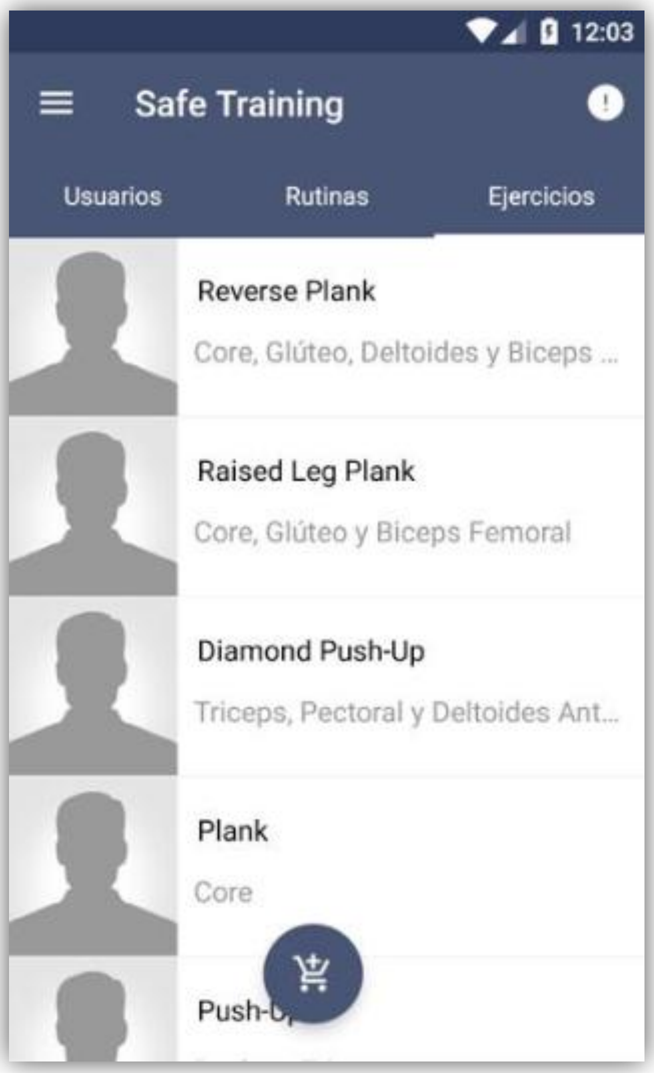
*You can not access the list of exercises until the routine complete button is tapped.

MAIN MENU - EXERCISES

The Exercises tab is the third tab of the main menu, this is the place to purchase and visualize the exercises.

This screen has:

- The application bar where you can leave the session or enter the information screen.
- The main menu that is divided into three (Users, Routines and Exercises).
- A list of exercises where the name and muscles involved are shown.
- A button to buy new exercises 🛒 (**future work that does not enter within the TFG planning**).



Reverse Plank
Core, Glúteo, Deltoides y Biceps ...

Raised Leg Plank
Core, Glúteo y Biceps Femoral

Diamond Push-Up
Triceps, Pectoral y Deltoides Ant...

Plank
Core

Push-U

Figure 3.30 Exercises

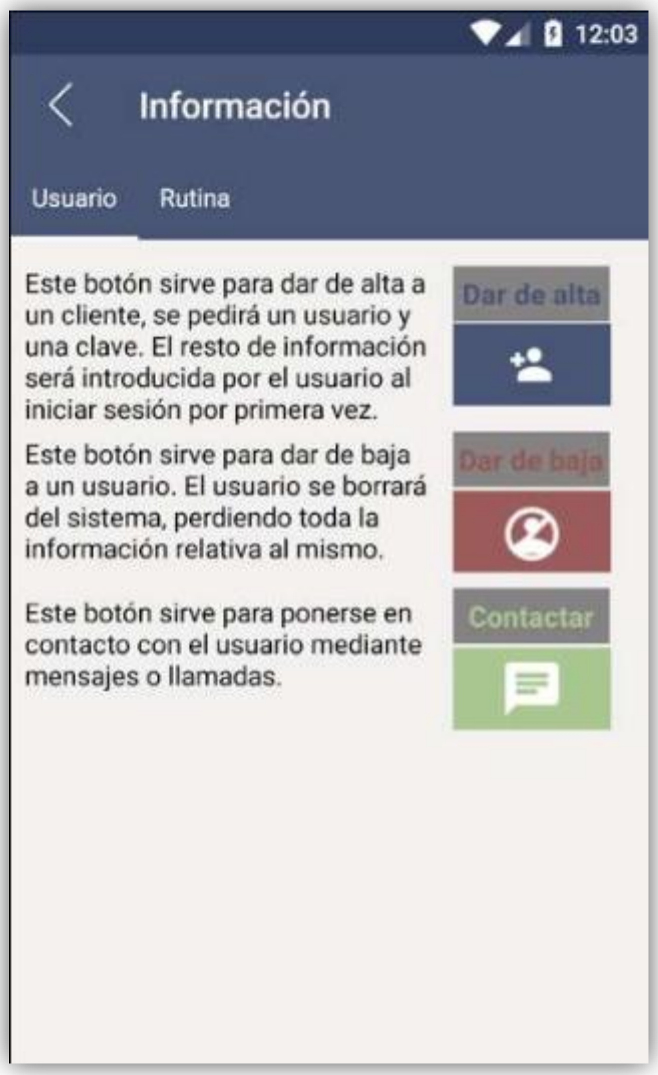
* The most involved muscles appear first.

INFORMATION

To access this screen you must press the information button ⓘ in the application bar.

This screen has:

- The application bar where you can return to the previous screen.
- The information menu that is divided into two User and Routine).
- A description of the different buttons.



Este botón sirve para dar de alta a un cliente, se pedirá un usuario y una clave. El resto de información será introducida por el usuario al iniciar sesión por primera vez.

Este botón sirve para dar de baja a un usuario. El usuario se borrará del sistema, perdiendo toda la información relativa al mismo.

Este botón sirve para ponerse en contacto con el usuario mediante mensajes o llamadas.

Figure 3.31 Information

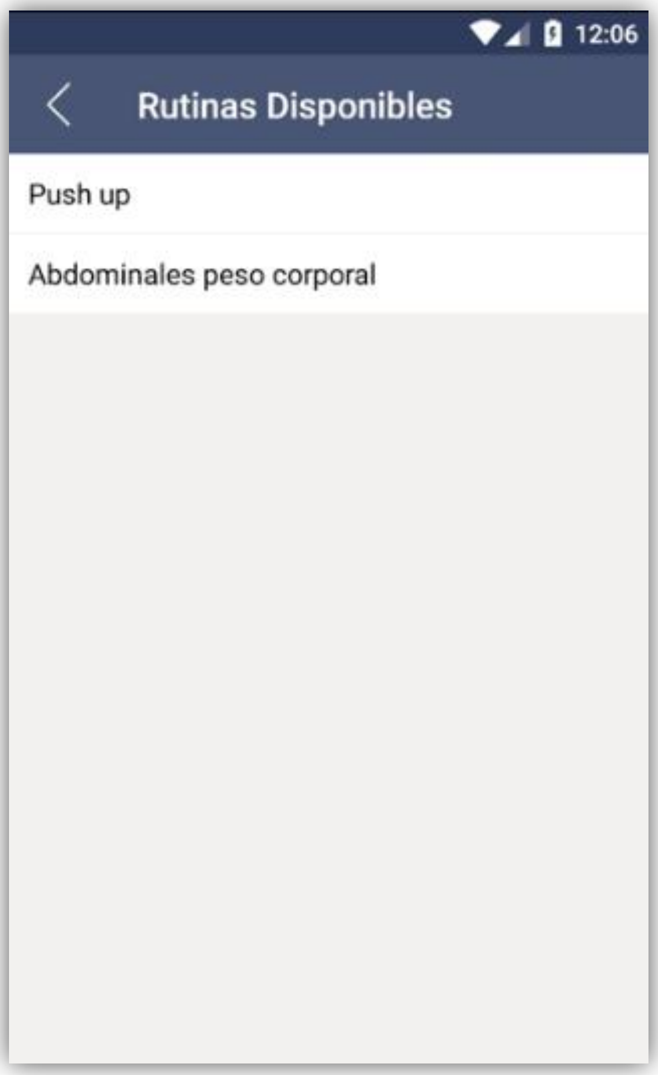
* This screen displays all kind of support information for the proper use of the application (**future work that does not enter within the TFG planning**).

SEARCH

To access this screen you must press the assign routine button ⏰.

This screen has:

- The application bar where you can return to the previous screen.
- A list of unassigned routines or available users.



12:06

Rutinas Disponibles

Push up

Abdominales peso corporal

Figure 3.32 Search

* If you press the assign routine button ⏰ within the routine tab of the user menu, a list of routines is displayed.

* If you press the assign routine button ⏰ within the routines tab of the main menu, a list of users will appear.

WORK DEVELOPMENT AND RESULTS

In this section we will explain the most relevant aspects of the work developed as well as the results of the work and applications. All deviations from the initial planning are detailed here. In addition to the objectives, both initial and final.

WORK DEVELOPMENT

During all this time the project has been evolving, reacting to the problems and solutions that have been presented. In this part only the necessary technical information is provided so that it is easily understandable to someone who is not well versed in the subject. The technical information is in the appendices and can be consulted whenever necessary..

INITIAL OBJECTIVES AND EXPECTED RESULTS

To carry this out, I will create a mobile application and a database that will be hosted on a web server [4], in this database the information of the users will be collected. This will allow to show the information in the mobile application of the personal trainer in different ways, such as graphics, text messages, percentages ...

The project is divided into the following objectives:

- Develop a mobile application to manage users information
- Make a comfortable interface to facilitate the use to the personal trainers
- Generate a web server where the database is hosted and the mobile application can access
- Create a database that stores all user data, both personal and those obtained from their workouts. An DB prepared to support the input information of different users and a mobile application capable of connecting to the database mentioned in the previous sentence to display and enter information in various ways, such as:
    - Publish the number of users that the coach has at their disposal as well as their profiles.
    - Manage the workouts that the user must perform and their errors.
    - Add new training sessions for users.
    - Show different graphs and texts that help the coach to see the progress of said user.
    - Be able to introduce new users.

OBJECTIVES ACHIEVED

The objectives that have been achieved during these months have been:

1. Create an authentication system for personal trainer.

2. Develop a mobile application to manage user information and routines.
   - ✓ Show the users that the personal trainer has.
   - ✓ Manage the training that the user performs and their errors.
   - ✓ Observe the errors of the routines.
   - ✓ Add / Delete new training sessions and reassign them.
   - ✓ Be able to enter / delete users.

3. Make a comfortable interface to facilitate the use of personal trainers.
   - ✓ Friendly.
   - ✓ Interoperability.
   - ✓ Effective.

4. Create an online database and communicate it with the application.
   - ✓ Security.
   - ✓ Realtime.
   - ✓ Authentication.
   - ✓ Cloud storage.

INITIAL PLAANNING VS FINAL PLANNING

INITIAL PLANNING

Table. 4.1.1. Initial Planning

Task to be performed	Start	End	Duration
Design of the online database	04/02/2019	06/02/2019	10
Design of the mobile application	07/02/2019	10/02/2019	14
Creation of the online database	11/02/2019	13/02/2019	10
Creation of the user screen	14/02/2019	21/02/2019	25
Linking the user screen with the DB	22/02/2019	28/02/2019	25
Creation of the add user screen and DB linkage	01/03/2019	05/03/2019	18
Creation of the profile screen and DB linkage	06/03/2019	13/03/2019	25
Creation of the sessions screen and DB linkage	14/03/2019	20/03/2019	25
Creation of the session screen and DB linkage	21/03/2019	04/04/2019	50
Creation of the add session screen and DB linkage	05/04/2019	10/04/2019	18
Communicate the DB with the partner's TFG	11/04/2019	30/04/2019	40
Perform memory	01/05/2019	15/05/2019	30
Preparation of the presentation	01/06/2019	10/06/2019	10
Total			**300**

FINAL PLANNING

Table. 4.1.2. Final Planning

Task to be performed	Start	End	Duration
TFG Technical Proposal	01/02/2019	04/02/2019	4
Design of the online database	04/02/2019	06/02/2019	10
Design of the mobile application	07/02/2019	13/02/2019	24
Creating the database on a server	14/02/2019	17/02/2019	8
Creation of the web page	18/02/2019	21/02/2019	8
Analysis and design document	22/02/2019	25/02/2019	5
Creation of the exercises screen and initial menu	26/02/2019	28/02/2019	7
Creation of user screens	01/03/2019	15/03/2019	40
Creation of routine screens	16/03/2019	26/03/2019	31
Redesign and adjustments of interface elements	27/03/2019	28/03/2019	6
Creation of the information screen	29/03/2019	29/03/2019	4
Study of available online DB	30/03/2019	30/03/2019	4
Creation of a database in Firebase	31/03/2019	04/04/2019	14
Creation of a database in Backendless	05/04/2019	08/04/2019	10
Creation of the session and linking screen	04/04/2019	14/04/2019	11
Linking the user screen with the DB	15/04/2019	20/04/2019	16
Linking the routine screen with the DB	21/04/2019	23/04/2019	13
Linking the exercises screen and errors	24/04/2019	24/04/2019	6
Interaction of user buttons	25/04/2019	25/04/2019	4
Search and design UI screen	26/04/2019	29/04/2019	14
Error correction	30/04/2019	03/05/2019	15
Interaction of routine buttons	04/05/2019	05/05/2019	6
Perform memory	07/05/2019	03/06/2019	30
Preparation of the presentation	04/06/2019	10/06/2019	10
Total			300

As you can see, the planning has evolved a lot, this is due to some internal and external problems that have arisen during the elaboration of the project. The most significant transformations are found in the DB, where it is completely changed to incorporate an authentication system. This allows you to create a secure login system in the application and provide the user with roles. It also allows cloud storage and realtime, two characteristics that are very important for the future of the project.

PROBLEMS FOUND

The problems that have arisen have been many and varied but can be included in two types: Internal and external. Then we talk about each problem, explaining it to understand the reason and then the solution is explained.

INTERNAL

These types of problems arise directly from the project itself or as a side effect of some of the external problems.

ONLINE DATABASE DESIGN

The main problem here is the failure to create the UML diagram, this makes the database is not consistent.

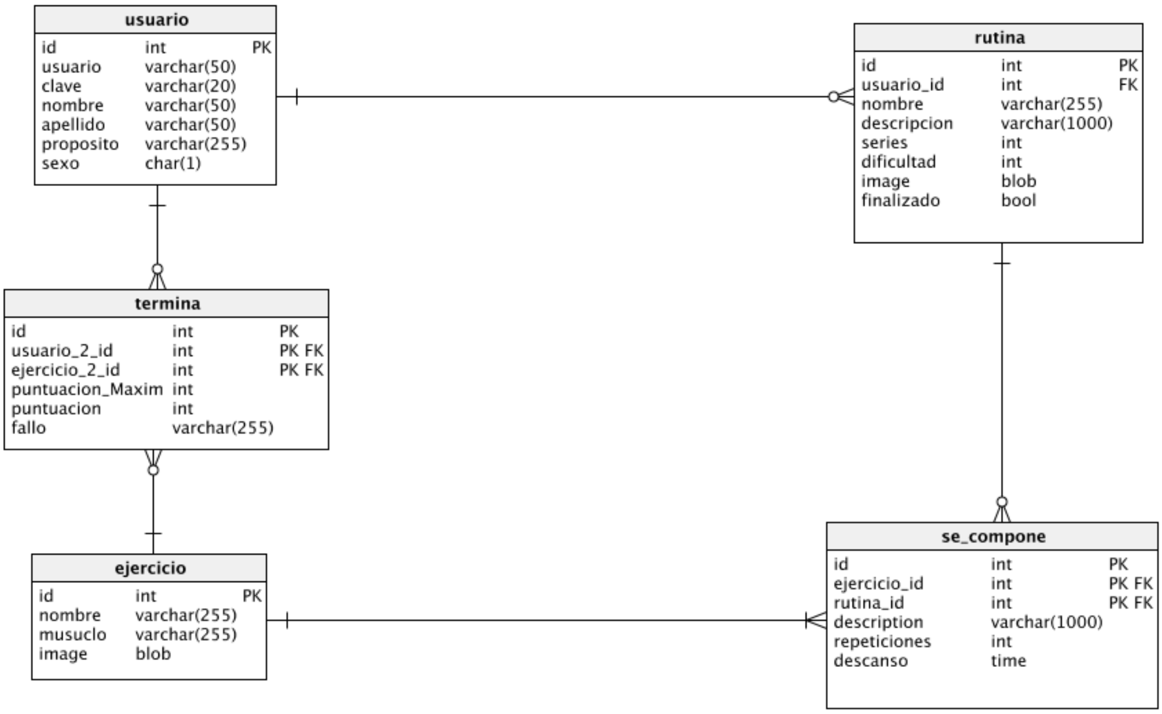


Figure 4.1 Incorrect Database

It happens because the failures were related to the exercises and not to the routines.

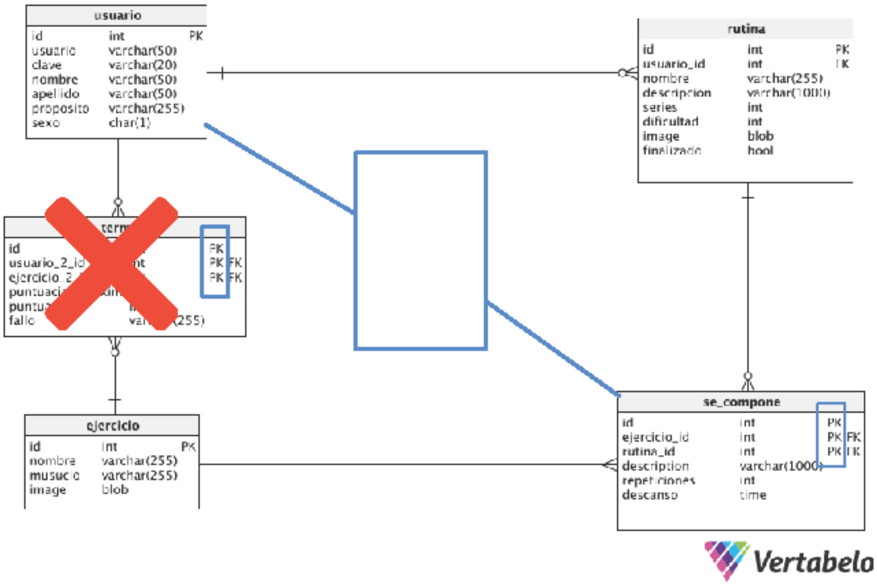
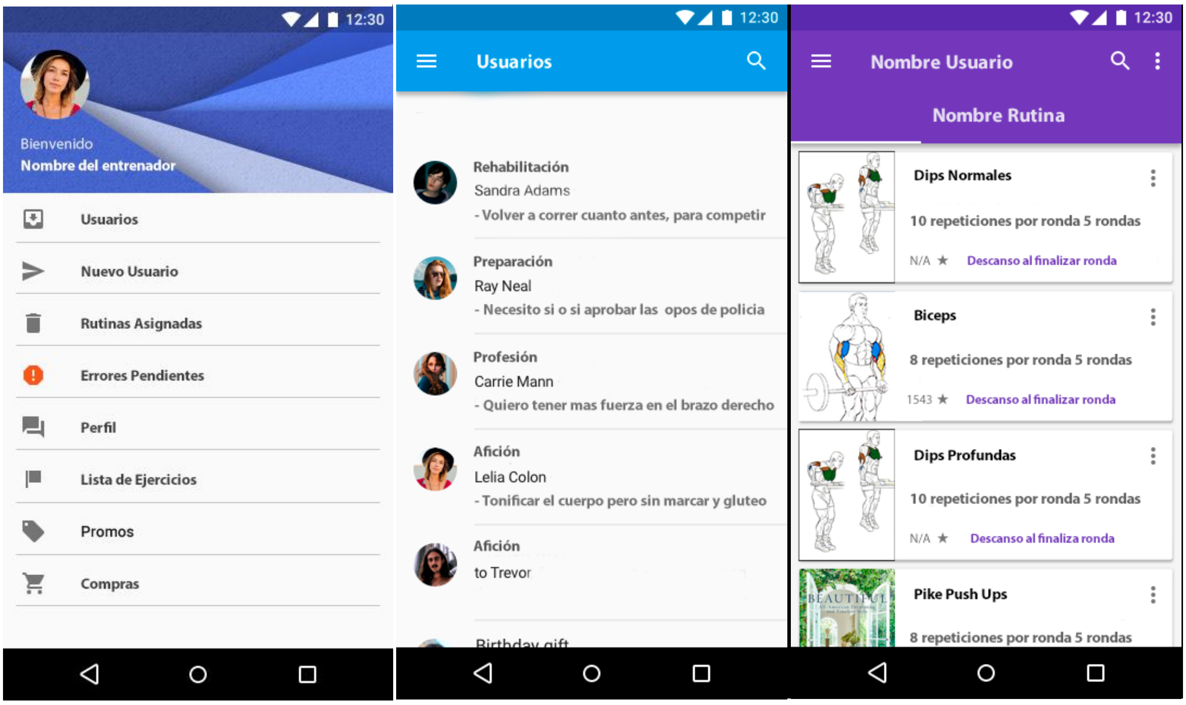


Figure 4.2 Correct Database

This solution came hand in hand after asking the professor of Databases Merche Marques, which indicated where the error resided. The “routineTerminated” table should be between User and the “routineExercise” table, thus obtaining all the necessary data.

APPLICATION DESIGN

The design of the application [5] also gave problems that resulted in a large increase in time. The relentless pursuit of interoperability and a friendly interface significantly hindered development. Until it was discovered a page where they had all the elements of android in ilustrator, thus allowing to streamline the design.



Rehabilitación
Sandra Adams
- Volver a correr cuanto antes, para competir

Preparación
Ray Neal
- Necesito si o si aprobar las opos de policia

Profesión
Carrie Mann
- Quiero tener mas fuerza en el brazo derecho

Afición
Lelia Colon
- Tonificar el cuerpo pero sin marcar y gluteo

Afición
to Trevor

Birthday gift

Dips Normales
10 repeticiones por ronda 5 rondas
N/A ★ Descanso al finalizar ronda

Biceps
8 repeticiones por ronda 5 rondas
1543 ★ Descanso al finalizar ronda

Dips Profundas
10 repeticiones por ronda 5 rondas
N/A ★ Descanso al finaliza ronda

Pike Push Ups
8 repeticiones por ronda 5 rondas

Figure 4.3 Concept Design

As you can see at the beginning opted for something more professional, following a style like gmail. However, after talking with the partner, we came to the conclusion that a main menu as a list of options was impractical and boring. Not very practical because if the mobile was very small the trainer has to use the scrollbar and look for that element. Bored because so many options on a screen is quite annoying, in addition to generating a greater sense of complication, something that you want to avoid at all costs. In the end the number of options on the screen was reduced and opted for something less professional and more friendly.

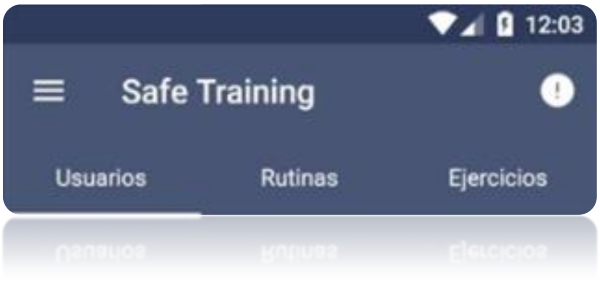


Figure 4.4 Main Menu Design

To make this possible, the WhatsApp style was used as a reference, generating a main menu and the occasional secondary menu. This allowed an improvement of movement by the application which resulted in a huge increase in comfort and efficiency. To increase the sense of professionalism blue colors were used since they convey safety, reliability, solvency, temperance and confidence.

ERROR CORRECTION

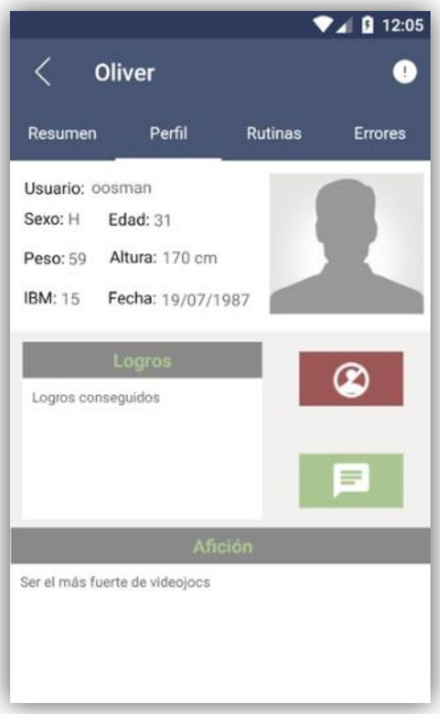
Another problem to consider has been the mistakes, since many were left to the end. A decision that will never happen again, because it became very difficult to find the reason for the error between so many classes and lines of code. Priority was given to the number of advances in the quality of the same and in the end it was paid (lesson learned).

EXTERNAL

This type of problems arise from the TFG of the partner, decisions and inconveniences that make it difficult for the partner or me. This was mainly due to the external problems that overwhelmed the partner and did not let him move forward in his TFG.

CHANGES IN THE INTERFACE

When a large part of the interface was implemented, the partner suggested adding some changes, such as the system of achievements. This obliged us to modify the user profile, in order to do so we looked for ways to generate a space for this information.



Usuario: oosman
Sexo: H Edad: 31
Peso: 59 Altura: 170 cm
IBM: 15 Fecha: 19/07/1987

Logros conseguidos

Ser el más fuerte de videojocs

Figure 4.5 User Perfil Design

Of course, own decisions also generated problems for him. There is no problem with all this since it was known from the beginning that doing two related TFGs went with a small load included.

There were many more interface changes such as adding the icon in the routines or the circle in the users. But the most significant was undoubtedly the creation of routines, because these were the engine of the game and one of the parties where the TFG were united. After several changes, the consensus did not arrive and it was decided to wait for the partner to advance more in his TFG.

However, not all the adjustments and changes were due to the partner. To simplify further, it was decided to remove the errors tab from the main menu. This only ordered users based on the number of errors.

THE CARLOS HERNÁNDEZ PROJECT STAYS STOPPED

It was decided to change much of the planning, when the partner stopped work due to external problems. Now the objective was to focus on those points where its part was not needed, ie authentication and improvements within the application itself.

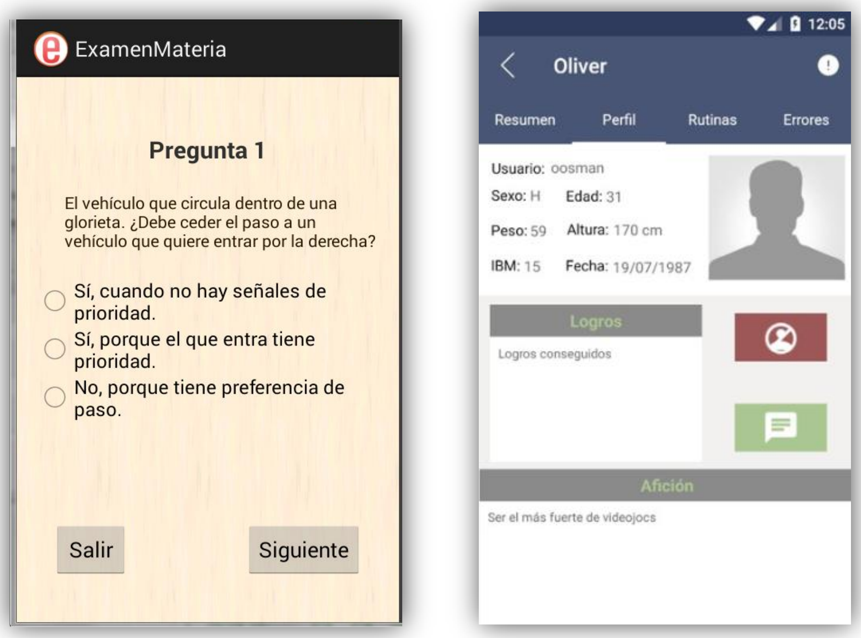
We studied possible ways to introduce authentication, first with Firebase, a service that offers a database in the cloud and which has authentication integrated. In addition to an easy implementation in Unity, however, there was a big drawback. Firebase followed a NoSQL model, which complicated the issue quite a bit. So it was decided to start again but this time with another service, Backendless. Fortunately, this service had already been used by coworkers, who were very helpful.

RELEVANT ASPECTS

For someone with a higher degree in cross-platform application design, the mobile application does not have anything of the other world, they are a set of lists, CardView and PagerView [6].

On the other hand in the database it has required a lot of work, but in the end among coworkers, youtube and hours has been easily taken forward. The study of the operation of the service has more merit than the implementation effort. The discovery of this service to implement applications is very good because it facilitates everything enough and reduces development time. They are incredible this type of services, where increasingly simplify the task to the programmer.

Now, let's start with the two most relevant aspects, interface design and interrelated work. The design and development of the interface is without a doubt what has taken the longest, with a very good final result that feels really comfortable. Programming on the other hand has never been an inconvenience in the development of this project, thanks to the stage in the upper level where you learned a lot about java and android. That is why in this TFG has wanted to go much deeper in the interface design. Then two images are left to really understand what is being talked about: the first represents the project of superior degree and the second represents the TFG.



ExamenMateria

Pregunta 1

El vehículo que circula dentro de una glorieta. ¿Debe ceder el paso a un vehículo que quiere entrar por la derecha?

○ Sí, cuando no hay señales de prioridad.
○ Sí, porque el que entra tiene prioridad.
○ No, porque tiene preferencia de paso.

Usuario: oosman
Sexo: H Edad: 31
Peso: 59 Altura: 170 cm
IBM: 15 Fecha: 19/07/1987

Logros

Logros conseguidos

Afición

Ser el más fuerte de videojocs

Figure 4.6 Design Comparation

We must highlight the interrelated TFGs because there is a lot of work behind, much greater than it may seem at first sight. In addition, you have to know how to organize yourself very well and analyze everything in much more detail. You also learn to say no, something very important in this life, because not everything is viable in the period of time established. For example: Implement a mechanic or system that is easy in a TFG but that greatly hinders the other. Many notions of work have been learned by performing the TFG in this way.

RESULTS

In this section the results of the work are described, focusing on the results obtained and referring to the initial objectives. The results of the work are:

- Connect to an online database.
- Create users: From the "New user" screen, the user and password will be entered.
- Unsubscribe users: If you have never logged in, from the screen create users, in case of login, it must be done through your profile.
- Create Routines: From the "Create Routine" screen, the routine data (series, repetitions ...) will be introduced.
- See the profile of the users: the personal data, the pending routines, the finished ones and the errors.
- Show the assigned routines and their information.
- An effective, friendly and interoperable interface.
- The database has an authentication system (this point was not in the initial objectives).

REAL APPLICATION AND LAUNCHES

This project is an innovation in the market of personal trainers, thanks to this, the personal trainer may have more users at their disposal and users can perform routines at home with the supervision of a professional. The application would be free on Google Play, to enter you require an account which you would have to buy. Depending on which account has more or less exercises that can be purchased within the application, either alone or in packs. This last function does not fit into the plans of the TFG.

An example of use, a coach discharges a client and enters the game. Being the first time you enter, you will be asked to fill in all your information. The client fills in and enters the main menu, where he will show the routines he has available. If the coach has created one for you today, you can do it. Once the routine is finished, it sends the errors to the database being the coach warned of such errors.

The application has not had any releases to date, however, on 20/05/2019 will be created in shared folder to be able to observe and have all the code available. In the future it is planned to remove the application through GooglePlay.

CONCLUSIONS AND FUTURE WORK

In this chapter, the conclusions of the work and future extensions are shown.

CONCLUSIONS

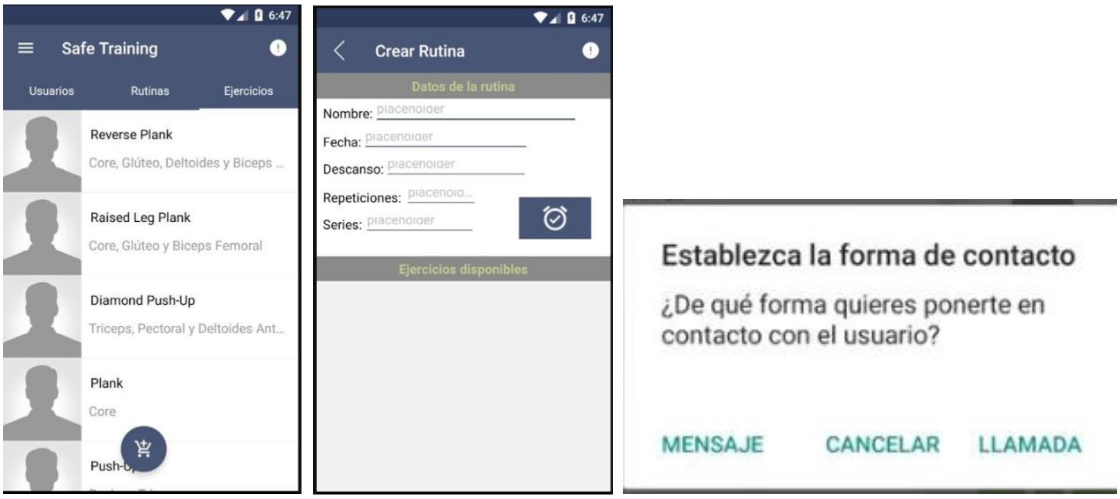
The experience of the TFG has been a mixture of sensations or stances, on the one hand it has been fascinating and on the other terrifying. Fascinating because I have applied many concepts of the career and the two higher degrees I have studied (Development of Web applications and Development of applications Multiplatform). I have also known and learned something from Backendless, a service that makes things much easier and it is very likely that the future will pull in that direction.

It has also been scary because doing something from scratch you alone always scares, and when the partner was stranded, he did not know what to do. I have always pushed forward thinking about the future of the project rather than the TFG. Trying to leave everything well planted so that it does not have to be deleted and giving priority to elements that are good. It is for this reason that the creation of routines has stayed that way, because for good it would be necessary to dedicate a single TFG to the realization of routines.

At the level of learning programming it has not been so much since the vast majority of things knew thanks to the degree. However, I have improved a lot in interface design and implementation, something very necessary in these times. I have also discovered that many of the things I had learned have been changing these years. Also thanks to this TFG I have discovered that mounting your own server to have an online database no longer makes sense, there are much better options.

FUTURE WORK

The work can continue and should, because it has a lot of potential. It is true that the most important part, that of the partner, is missing. But if you finish doing it, then this project will continue forward and that is why I have been planting seeds throughout the entire project such as the purchase of exercises, calls and the system to create improved routines. These are the points you need to implement in the future to be a competent application.



Reverse Plank
Core, Glúteo, Deltoides y Biceps ...

Raised Leg Plank
Core, Glúteo y Biceps Femoral

Diamond Push-Up
Triceps, Pectoral y Deltoides Ant...

Plank
Core

Push-Up

Nombre: placeholder
Fecha: placeholder
Descanso: placeholder
Repeticiones: placeholo...
Series: placeholder

Establezca la forma de contacto

¿De qué forma quieres ponerte en contacto con el usuario?

Figure 5.1 Future Work

OTHER CONSIDERATIONS

BIBLIOGRAPHY

There are many more links, but only the most relevant ones are shown.

DATABASE

WEB SERVER

https://es.000webhost.com/creador-sitios

BACKENDLESS

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MOVIL APLICATION

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https://www.flipandroid.com/la-mejor-manera-de-implementar-view-onclicklistener-en-android.html

I also looked at the class notes of the upper grade in Multiplatform Applications Design.

APP DESIGN

https://www.rafelgil.com/blog/marketing-emocional/psicologia-color-azul/

https://www.mique.es/diseno-grafico-plano-o-flat-design/

https://en.wikipedia.org/wiki/Flat_design

http://appdesignbook.com/es/contenidos/diseno-visual-apps-nativas/

DESIGN OF SCHEMES FOR MEMORY

https://www.lucidchart.com

http://dia-installer.de/index.html.es

LINK TO THE DEMO, CODE AND WEB PAGE

Then the relevant links are left:

DEMO

https://drive.google.com/drive/folders/1PZiS0zp8an_c2A01qZf6r3pfm6tJidDR?usp=sharing

CODE

https://drive.google.com/drive/folders/1HH0nnLhbkTsIBPfWYu3oklnDjGUsP0Hn?usp=sharing

WEB PAGE

http://www.entreper.tk/

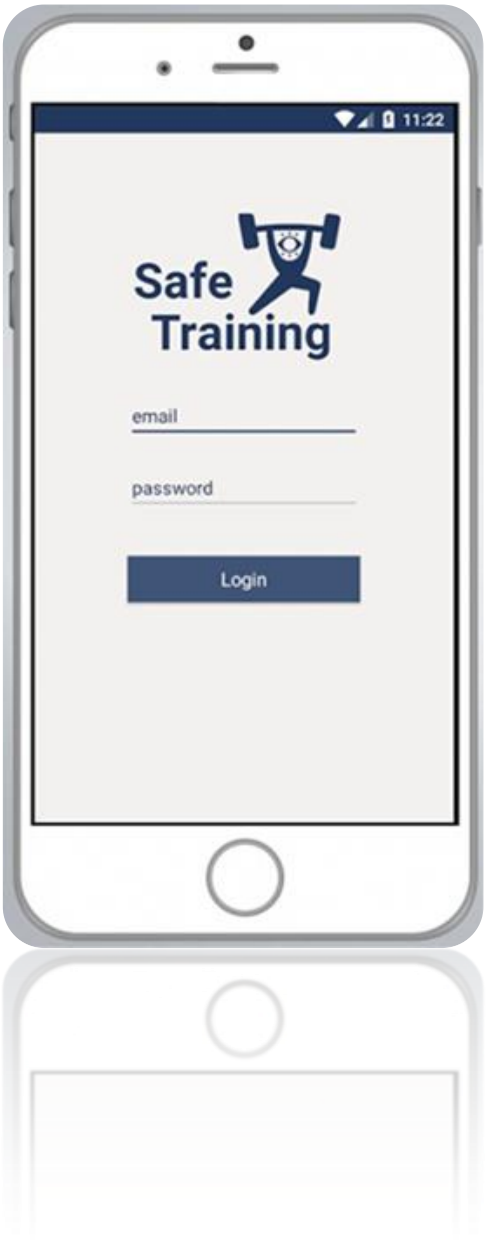

Figure 6.1 Safe Training