



Escuela de
Ingeniería
Informática

INTERNSHIP REPORT

Mobile development – Ovis application

Wafi GRISSI

School of computer science engineering

Oviedo - Spain

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Thanks

At first, I would like to thank the IUT of Valenciennes which allowed me to do this internship and especially to Mrs. OLIVIERA and Mrs. GUEUDET who made it possible.

I would like to thank too Mr. Fernando Alvarez Garcia and Mr. Daniel Fernandez Lanvin and Mr. Luis Vinuesa, my supervisors.

I would like to thank Mr. Philippe POLET for following me up.

I would like to thank Nord-Pas-De-Calais region for the financial help to do this internship.

Finally, I would like to thank all members of the engineering school for their reception during these three months.

Abstract

My internship took place in the school of computer science engineering of Oviedo. I chose this offer because I want to improve my skills as a developer. I want to do a bachelor degree in development then a Master in Mobile development. This is why this school represented for me the best way to learn and apply theoretical knowledge I have learnt during my DUT at the IUT of Valenciennes. An institution that seeks to revolutionise its approaches.

The aim of my internship is to create a mobile application that will allow to the school's students to display their own timetable, get a follow-up on their courses and synchronize the timetable with a calendar app.

A prestigious computing engineering school, founded in 1982, that provides an integral formation in Computer Science, including all levels designed by the European Space of Higher Education (ESHE): graduate, master and doctorate.

My missions were to find a solution for timetable management problems based on the new technologies, namely mobile development.

To that end, I did go through three parts. The first one is to familiarize with the school operating to understand the methodology. The second part is to have a better approach of mobile and web development to know the different possibilities to solve the problems. The third one is to match between the two previous parts with its aims and constraints.

I had the chance to visit Oviedo and learn more about the Spanish culture.

Résumé

Dans le cadre de ma deuxième année en DUT Informatique, j'ai souhaité effectuer mon stage de validation des acquis théoriques à l'étranger ; L'opportunité de travailler au sein de l'école d'ingénieur d'Oviedo me fut proposée.

Ayant pour objectif de travailler à terme dans le développement, le sujet de stage était donc compatible avec mon projet professionnel.

L'objectif de mon stage est de créer un espace numérique pour les étudiants afin d'avoir un accès en temps réel à leur emploi du temps, à différentes annonces du secrétariat.

L'école souhaite donc fournir un accès mobile aux données des étudiants (emploi du temps), mais aussi à des annonces telles qu'un changement au niveau des emploi du temps, la planification des examens.

Etant spécialisée dans l'Informatique, l'école veut adapter, révolutionner son accès à l'information et mais aussi son encadrement.

Mes missions consistaient donc à trouver une solution à la problématique qui sera non seulement tirée du cœur de la révolution technologique, en l'occurrence le développement mobile, mais aussi adaptée au domaine académique de l'école et ses activités.

Pour ce, il fallait englober différentes tâches qui se résumaient à connaître l'école, ses activités et son fonctionnement afin de comprendre leur méthodologie et le contexte du projet ; Cela étant la première partie, elle sera suivie d'une deuxième qui nécessite une approche approfondie du développement mobile pour étudier les différentes solutions possibles. Pour finir, la troisième partie consiste à relier les deux premières, en fixant une implémentation, des objectifs et contraintes.

Introduction

By 2020, 70% of the world's population will own a smartphone ; A very strong figure revealed on the site of Android, and that speaks a lot about the future changes, whether in the technological or industrial field.

Mobile development is therefore very promising ; Providing flexible and revolutionary solutions.



School introduction

Since its foundation in 1982, the School of Computing Engineering of the University of Oviedo has been a national reference in training professionals in computer science.

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Address: Valdés Salas s/n. 33007 - Oviedo
Telephone: 985 10 95 49

Location

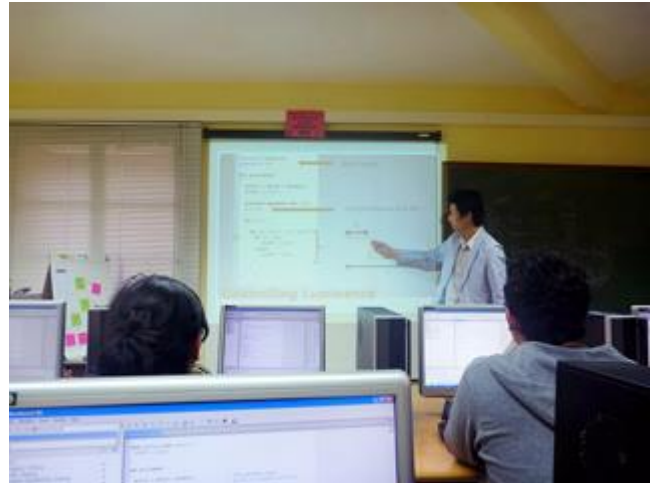
The School of Computing Engineering is located in Oviedo, capital city of the Principality of Asturias, an important financial, industrial and technological centre of the North of Spain. Oviedo is a safe and beautiful city, being the administrative and political centre of the whole region. The city is communicated by plane with the main European and national capital cities : Madrid is just an hour away; Paris, London, Brussels and Barcelona are about hour and a half away while Zurich is only 2 hours from Oviedo.

Specialists on Computer Science

The centre provides an integral formation in Computer Science, including all the levels designed by the European Space of Higher Education (ESHE) : graduate, master and doctorate.

Its facilities are specially designed to teach Computer Science :

- 16 laboratories with over 400 computers.
- 6 classrooms with 691 seats.
- 2 all-purpose rooms that can be used as:
 - o Usability laboratories.
 - o 3D filming studios.
 - o Audiovisual recording and editing labs.
 - o Brainstorming.
- Electronics laboratory.
- Wi-Fi Internet connection in all the areas of the building.
- Virtual machines that host an individual virtual server for every student of master courses.
- Auditorium with 112 seats.



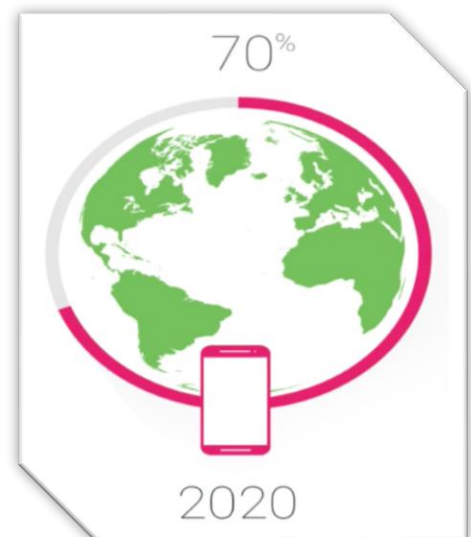
Project summary

At the beginning, I had to choose between Web programming (Ionic) and Mobile programming (Android/iOS). My supervisors and I, opted for Mobile development ; On Android.

The subject of the mission is to create an application that gives the students of the school access to their own timetable with a follow-up.

This application allows the user to connect via his ID of University ; Can also store it for an autocomplete next time he tries to log in.

Once connected, the student can display his timetable, get notifications about next courses and the possibility to synchronize the timetable (csv format) with a calendar app.



The problematic

As a student, direct access to the timetable is important ; To be informed of classes planning, and possibly any changes.

Therefore, this raises several questions on different fields; Especially in the choice of technology. Different technologies solve this problem, but in different ways. It is therefore essential to choose the solution that best meets our defined criteria. Criteria are based, among others, on cost, accessibility, relevance.

The technology

The possibilities

Ionic :

Ionic is a complete open-source SDK for hybrid mobile app development. The original version was released in 2013 and built on top of AngularJS and Apache Cordova. The more recent releases, known as Ionic 3 or simply "Ionic", are built on Angular. Ionic provides tools and services for developing hybrid mobile apps using Web technologies like CSS, HTML5, and Sass. Apps can be built with these Web technologies and then distributed through native app stores to be installed on devices by leveraging Cordova. Ionic was created by Max Lynch, Ben Sperry, and Adam Bradley of Drifty Co. in 2013.



Android :

Android is a mobile operating system developed by Google, based on a modified version of the Linux kernel and other open source software and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android is also associated with a suite of proprietary software developed by Google, including core apps for services such as Gmail and Google Search, as well as the application store and digital distribution platform Google Play, and associated development platform.



iOS :

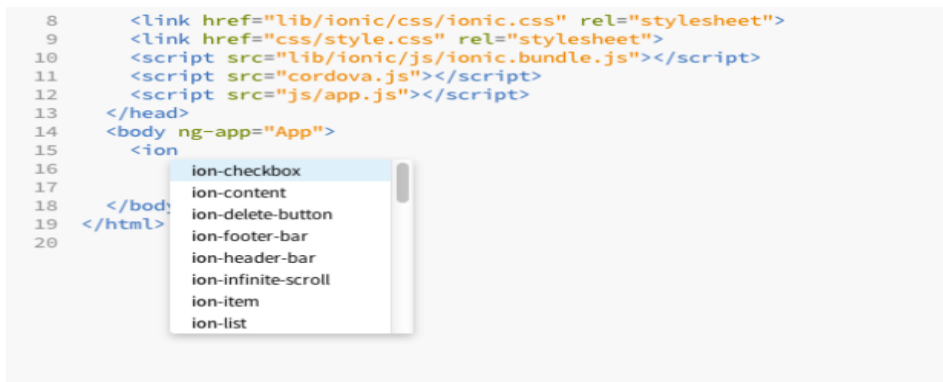
iOS (formerly iPhone OS) is a mobile operating system created and developed by Apple Inc. exclusively for its hardware. It is the operating system that presently powers many of the company's mobile devices, including the iPhone, iPad, and iPod Touch. The iOS SDK (Software Development Kit) allows for the development of mobile apps on iOS. Combined with Xcode, the iOS SDK helps developers write iOS apps using officially supported programming languages, including Swift and Objective-C.[130] Other companies have also created tools that allow for the development of native iOS apps using their respective programming languages.



The choice

Tests

I read different documentations, tutorials of the frameworks ; To select the proper solution.






IONIC - CODE EXAMPLE



ANDROID – CODE EXAMPLE

Selection

After studying the different possibilities, my tutors and I decided to choose android.
Following is a table comparing the different possibilities :

	<div> Android Studio ★★★★★</div>	<div> Ionic ★★★★★</div>	<div> Apple iOS ★★★★★</div>
Meets Requirements	<div><div></div>9.1</div>	<div><div></div>8.0</div>	<div><div></div>9.0</div>
Ease of Use	<div><div></div>8.6</div>	<div><div></div>8.6</div>	<div><div></div>9.3</div>
Ease of Setup	<div><div></div>8.1</div>	<div><div></div>9.1</div>	<div><div></div>9.2</div>
Ease of Admin	<div><div></div>8.2</div>	<div><div></div>9.0</div>	<div><div></div>8.4</div>
Quality of Support	<div><div></div>8.4</div>	<div><div></div>7.9</div>	<div><div></div>8.8</div>
Ease of Doing Business With	<div><div></div>8.4</div>	<div><div></div>8.5</div>	<div><div></div>8.7</div>
Product Direction (% positive)	<div><div></div>9.4</div>	<div><div></div>9.3</div>	<div><div></div>8.6</div>

Planning

The internship is divided in 3 major parts :

« School » part :

In this part, I got to know the school and its planning system. It represents 10% of the internship period.

« Conception » part :

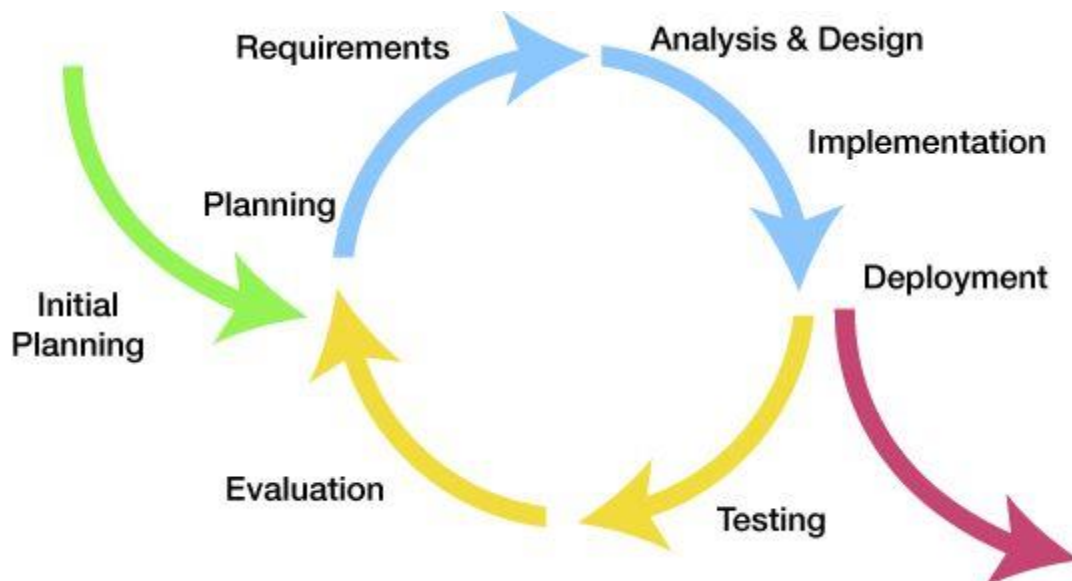
In this part I got to design the application. It represents 45% of the internship period.

« Development » part :

In this part I got to develop the application. It represents 45% of the internship period.

Cycle

I followed an iterative and incremental cycle as the needs were updated periodically. So the second and third parts were sequentially repeated. Every Wednesday, a meeting was held to check the progress of the project, specify and modify the needs.



Objectives

The application must meet the following needs :

Authentication

- Aim :
This feature allows the user to log in.
- Description :
The user inputs his UO (ID), the system checks the existence of the UO ; In case it exists, the application logs the user in.
- Priority level :
High

Remember me

- Aim :
This feature allows to the user to save his UO ; And now log in automatically.
- Description :
The user, after filling his UO, checks the « remember me » box, and once clicked on the log button, the system stores his UO for automatic connection from now on.
- Priority level :
High

Timetable display

- Aim :
This feature allows the user to show his timetable.
- Description :
After login in, the system gathers data from server/database and displays the timetable in different views.
- Priority level :
High

Classes alarms

- Aim :
This feature allows the user to enable alarms to the corresponding classes ; Triggered few minutes before start time.
- Description :
The user gets a notification few minutes before the next class starts ; Viewing the name and room of the class.
- Priority level :
High

Secretariat notifications

- Aim :
This feature allows the user to get notifications from the secretariat
- Description :
In case of exams, changes, the user receives detailed notifications from the secretariat
- Priority level :
High

Calendar synchronization

- Aim :
This feature allows the user to synchronize his timetable and his calendar application
- Description :
The user can import his classes into calendar application (ex : Google Calendar)
- Priority level :
Medium

Means

In this project, several means were employed.

Hardware :

- Computer
- Printer
- Mobile phone

Software :

- IDE (Android/Ionic)
- Planners (Trello)
- Versioning platform (GitHub)
- Design platform (Modelio)
- Text editors (MS Office/Brackets)



Documentation :

- APIs
- Tutorials

Cost

All the means used are freely accessible, so the project knows no monetary cost.

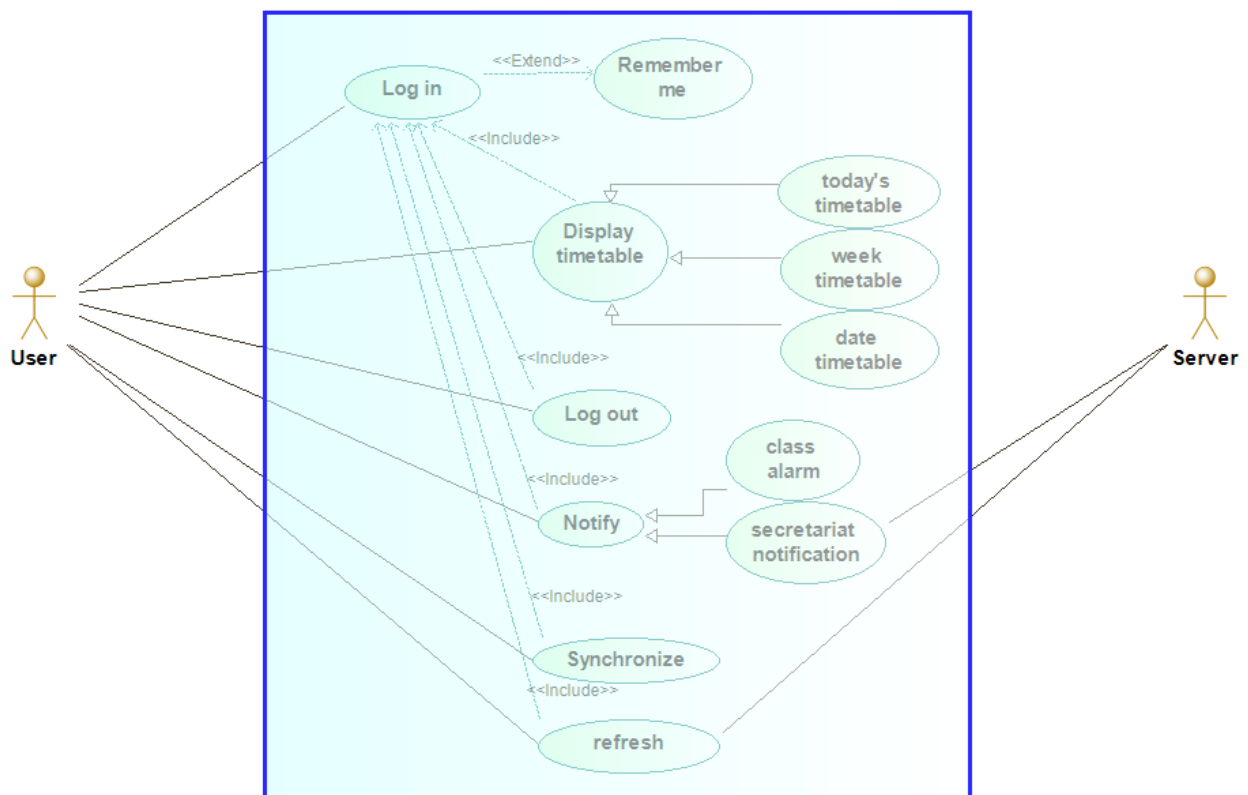
Conception

Requirements

Functions :

The application has several functions :

- Log in
- Remember me
- Display timetable
 - o Today's timetable
 - o Week timetable
 - o Specific date timetable
- Log out
- Notification
 - o Classes alarms
 - o Secretariat notications
- Refresh
 - o On click refresh
 - o Automatic refresh
- Synchronization



Textual description

Title : Log in

Abstract : This use case allows the user to connect to the application

Actors : User

Preconditions :

- Internet access

Nominal scenario :

1. The system checks the existence of an UO
2. The user types in his UO, checks « remember me » box and clicks on log in button
3. The system checks the Internet access
4. The system checks the existence of the UO
5. The system stores the UO in preferences then signs the user in

Alternate sequences :

A1. Existing UO

This sequence starts at point 2 of the nominal scenario :

2. The system checks the Internet access
3. The system signs the user in

A2. Wrong UO

This sequence starts at point 5 of the nominal scenario :

5. The system shows a toast notifying the user of the invalidity of the UO
6. The user types again his UO
7. The system checks the Internet access
8. The system checks the existence of the UO
9. The system signs the user in

Exceptional sequences :

E1. Unavailable network

This sequence starts at point 4 of the nominal scenario :

4. The system shows a toast notifying the user of the lack of connection

Title : Display timetable

Abstract : This use case allows the user to show his timetable

Actors : User

Preconditions :

- Internet access
- Logged in

Nominal scenario :

1. The user clicks on « myWeek » card
2. The system extracts data
3. The system displays the timetable in week view

Alternate sequences :

A1. Different view

This sequence starts at point 4 of the nominal scenario :

4. The user choses day or 3 days view
5. The system displays the timetable in the proper selected view

Exceptional sequences :

E1. Missing data

This sequence starts at point 3 of the nominal scenario :

3. The system shows a toast notifying the user of the data lack

Title : Log out

Abstract : This use case allows the user to sign out from the application

Actors : User

Preconditions :

- Logged in

Nominal scenario :

1. The user clicks on « Log out » card
2. The system displays a popup to ask for user confirmation
3. The user confirms the log out query
4. The system deletes the UO and signs out the user

Alternative sequences :

A1. Cancel

This sequence starts at point 3 of the nominal scenario :

3. The user cancels the log out query
4. The system dismisses the popup

Title : Class alarms

Abstracts : This use case allows the user to schedule alarms to corresponding classes

Actors : User

Preconditions :

- Logged in

Nominal scenario :

1. The user clicks on « Class alarms » card
2. The system displays a popup to ask for user confirmation
3. The user confirms the query
4. The system creates alarms to the corresponding classes

Alternate scenario :

A1. Cancel

This sequence starts at point 3 of the nominal sequence :

3. The user cancels the query
4. The system dismisses the popup

Title : Refresh

Abstract : This use case allows user to refresh data

Actors : User

Preconditions :

- Internet access
- Logged in

Nominal scenario :

1. The user clicks on « Refresh » card
2. The system displays a popup to ask for user confirmation
3. The user confirms the query
4. The system checks the Internet access
5. The system refreshes the data

Alternate sequences

A1. Cancel

This sequence starts at point 3 of the nominal scenario :

3. The user cancels the query
4. The system dismisses the popup

Design :

Graphical charter

The application design is made to make the application intuitive ; With icons and color palette respecting the colors of the school.

The model sketch is in the attachements.

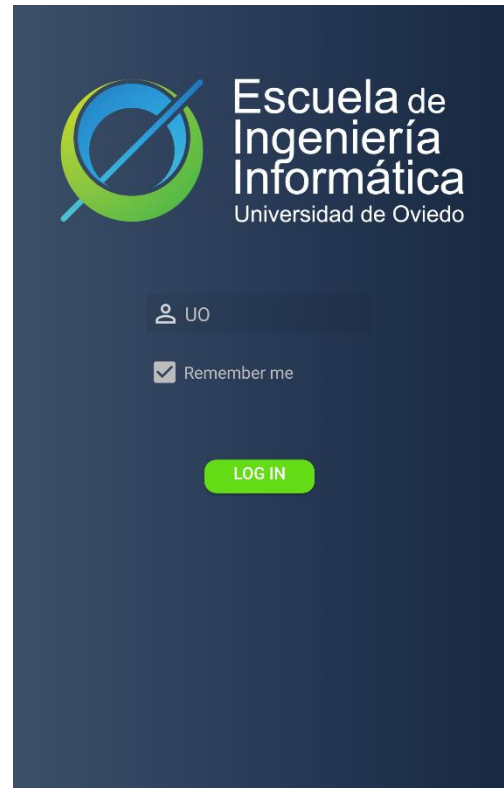
Log in screen

The first time ever that the user starts the application, this screen appears.

We find :

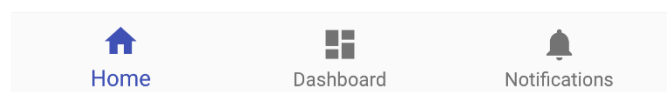
- School's logo
- Input text where the user can type his UO
- Checkbox to remember or not the UO (default : true)
- Button to log in to the application.

If the user checks the box, next time he starts the application, he will be directed to the home activity.



Navigation

The user have a navigation bar in the bottom of the home activity screen.



Home

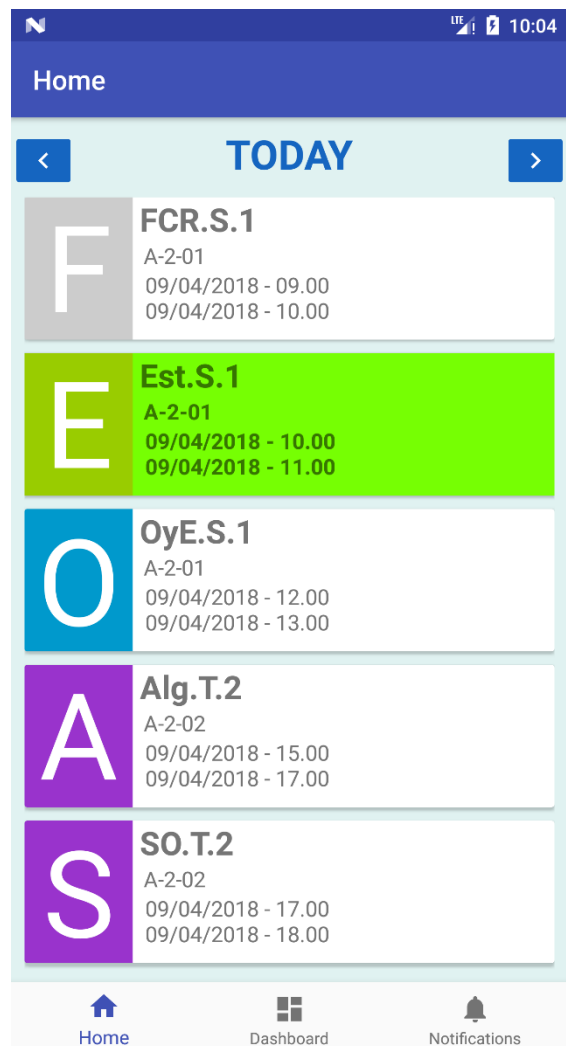
Home is the default tab of the home activity. In this tab, the user can see his today's timetable.

And two buttons to navigate through the days, and between the date.

Each class is represented in a square where we can find :

- First letter of the subject as an icon
- The subject
- Start date and time
- End date and time

Current class is colored in green.

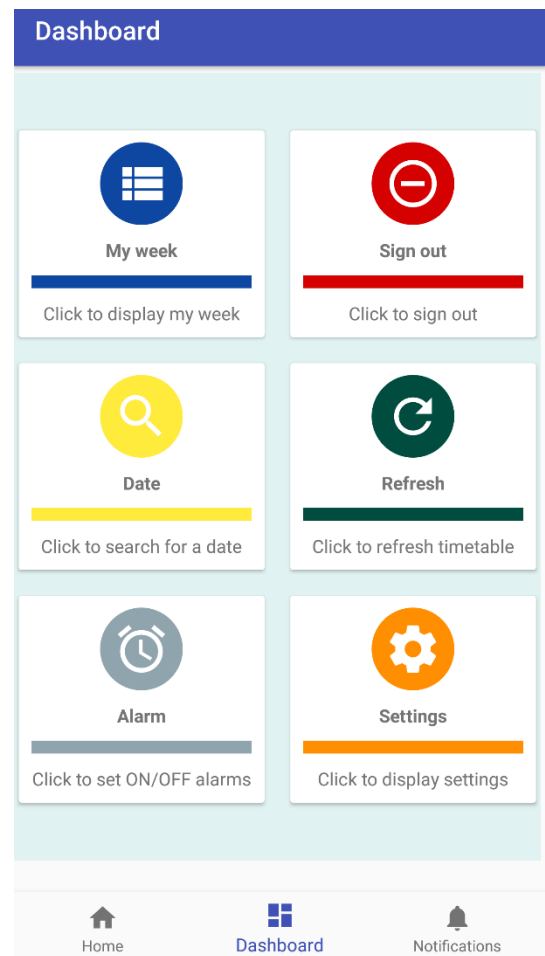


Dashboard

In this tab, the user have access to the different functions of the application.

Each feature is represented in a square where we find :

- Icon
- Name
- Description

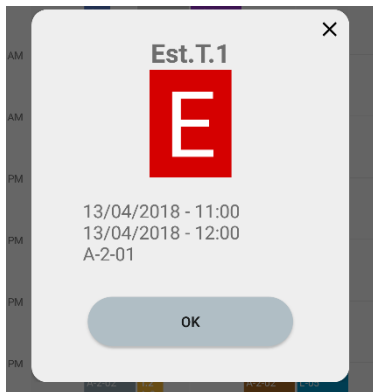


Timetable (Calendar view)

In this view, the user can see his timetable in :

- Day view
- Three days view
- Week view

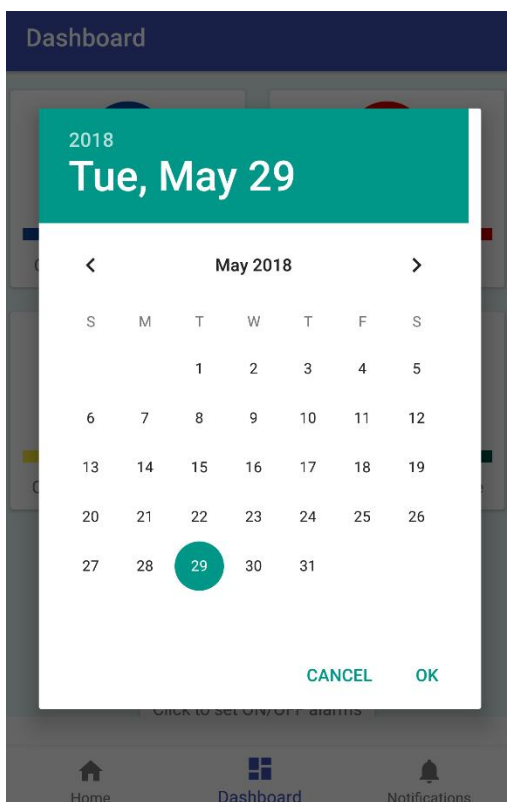
Each square represents a class. On click, a message dialog shows informations about the selected course :



Ovis						
TODAY DAY VIEW						
S 4/8	M 4/9	T 4/10	W 4/11	T 4/12	F 4/13	S 4/14
9 AM	FCR.S.1 A-2-01	Est.L.9 L-03	FCR.L.9 L-S-01			
10 AM		Est.S.1 A-2-01				
11 AM		FCR.T.1 A-2-01	OyE.T.1 A-2-01		Est.T.1 A-2-01	
0 PM	OyE.S.1 A-2-01	Est.T.1 A-2-01		FCR.T.1 A-2-01	OyE.T.1 A-2-01	
1 PM				OyE.T.1 A-2-01		
2 PM						
3 PM	Alg.T.2 A-2-02	TPP.T.2 A-2-02		BD.T.2 A-2-02	Alg.L.7 L-05	
4 PM						
5 PM	SO.T.2 A-2-02	CN.T.2 A-2-02	SO.T.2 A-2-02	CN.T.2 A-2-02		

Date picker :

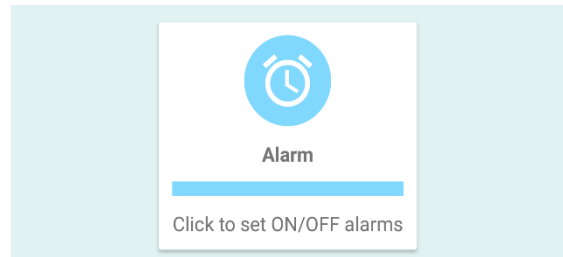
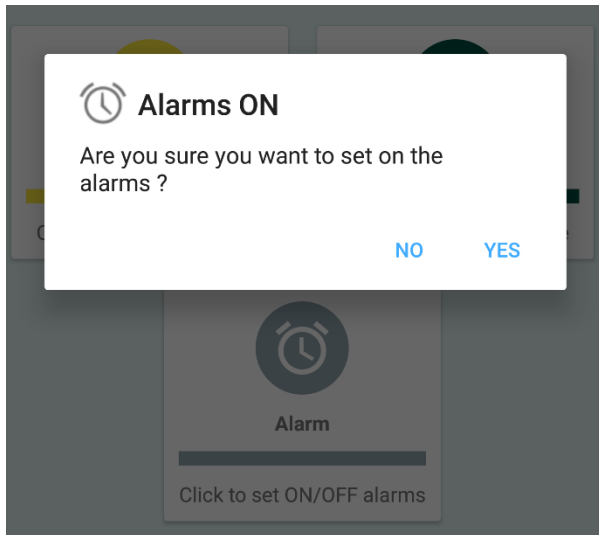
In this dialog, the application shows a calendar for the user ; To pick a specific date then show its timetable.



Classes alarm

If the user enables the alarms, notifications will show five minutes before each class.

- 1- The alarm card is grey before the user sets the alarms on. Then becomes blue.



- 2- Once set on and a class is going to start, the user receives a notification with the module name as title.

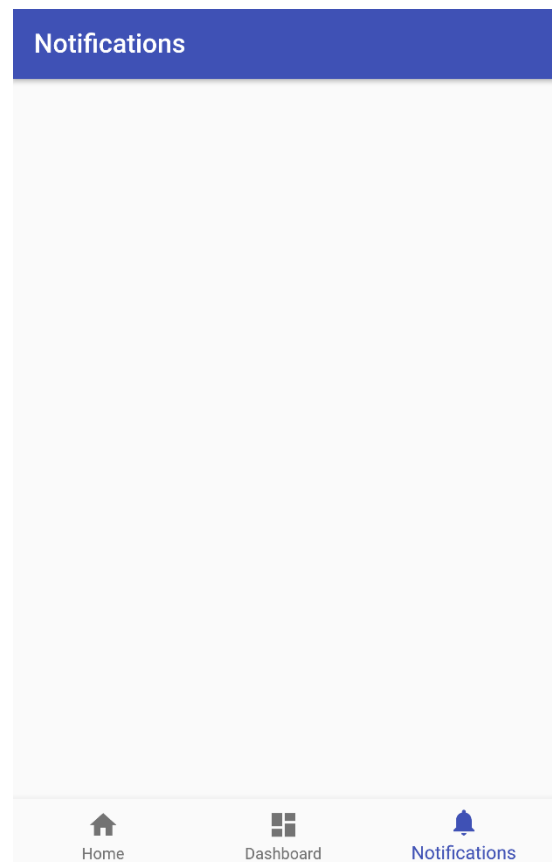


Notifications

In this tab, we have access to events received via notifications from secretariat.

Each event is represented in a square where we find :

- Logo
- Title
- Description



Development

Progress :

The file entitled « Progress » attached shows progress of functions' implementation.

Progress was checked every Wednesday.

The first three weeks were dedicated to research, documentation and design of the application.

Versioning :

I used GitHub for version control. I periodically recorded the progress by pushing the changes on this platform.



Features :

The first feature implemented was the connection with the « remember me » option ; A client connects to the university server via http protocol and looks for the user's identifier in the database (CSV files) ; Once found, the client downloads the schedule as a CSV file and saves it. If the user checked the « remember me » box, the system stores his UO in preferences, so next log in will be automatic. Then the log out feature ; The system deletes informations linked to the user from preferences.

The processing (reading/writing) and display methods followed this step; With an asynchronous implementation for several methods (with threads) to lighten and streamline the use of the application.

Then, the implementation of a calendar view was necessary in order to display the entire contents of the file ; Allowing the user to navigate freely and have a good visual of the schedule.

After this step, I had to implement the method of refreshing the data ; Using handlers and threads, which periodically refresh the user's data.

The next implemented method was the creation of alarms which correspond to the hours of the beginning of the course; By resuming the stored data, the system creates notifications that trigger a few minutes before each course indicating the module and location.

All methods are implemented except « Secretariat notification » and « Synchronization » which are in progress ; These two functions will be processed and finished in the period going from 16/06/2018 to 29/06/2018.

Tests :

I run different tests on the emulator given by Android Studio. Started with unit tests, to try the separate code tips; For example, separately testing the verification of the existence of the identifier, after testing the download of a file, and so on. Then, in the context of system tests, I join the different sub-methods, in an incremental way, to create the final method and test it. Some of these tests were run on a real mobile phone too.

Encountered difficulties :

- Firebase problem that blocked project creation (limited number)
- Lack of a cable to have an in time build
- Database lock exceptions when I didn't use Transactions
- Responsive design is missing lack of skills
- FCM partial implementation due to lack of skills

Conclusion

To conclude this internship, during these three months, I worked on a mobile development project. The first period, I researched, tested different technologies and platforms, consulted documentation and draw basic design. The second period, I chose the technology, I made a developed model of the application, I fixed the methods and functions. In the third period, I implemented the different methods, and tried to meet the expectations.

Personal review

This internship offered me a good professional experience but also allowed me to discover the professional world. I also developed my curiosity and autonomy.

This internship allowed me to use what I learned during my formation and improve my android programming skills. But also, to understand a little more the web services.

Key words

- Android
- Ionic
- Java
- XML
- Angular
- HTML
- CSS
- School
- Engineering

Bibliography

API – Documentation – Tutorials

<https://developer.android.com>

<https://stackoverflow.com>

<https://tutorialspoint.com>

Attachments

Progress cards

To do

Ajouter une carte...

In progress

NOTIFY

SYNCHRO

Ajouter une carte...

Finished

LOG IN

LOG OUT

REFRESH

DISPLAY TIMETABLE

Ajouter une carte...

To do

Ajouter une carte...

In progress

DISPLAY TIMETABLE

NOTIFY

SYNCHRO

Ajouter une carte...

Finished

LOG IN

LOG OUT

REFRESH

Ajouter une carte...

To do

SYNCHRO

Ajouter une carte...

In progress

DISPLAY TIMETABLE

NOTIFY

Ajouter une carte...

Finished

LOG IN

LOG OUT

REFRESH

Ajouter une carte...

To do

NOTIFY

SYNCHRO

Ajouter une carte...

In progress

DISPLAY TIMETABLE

Ajouter une carte...

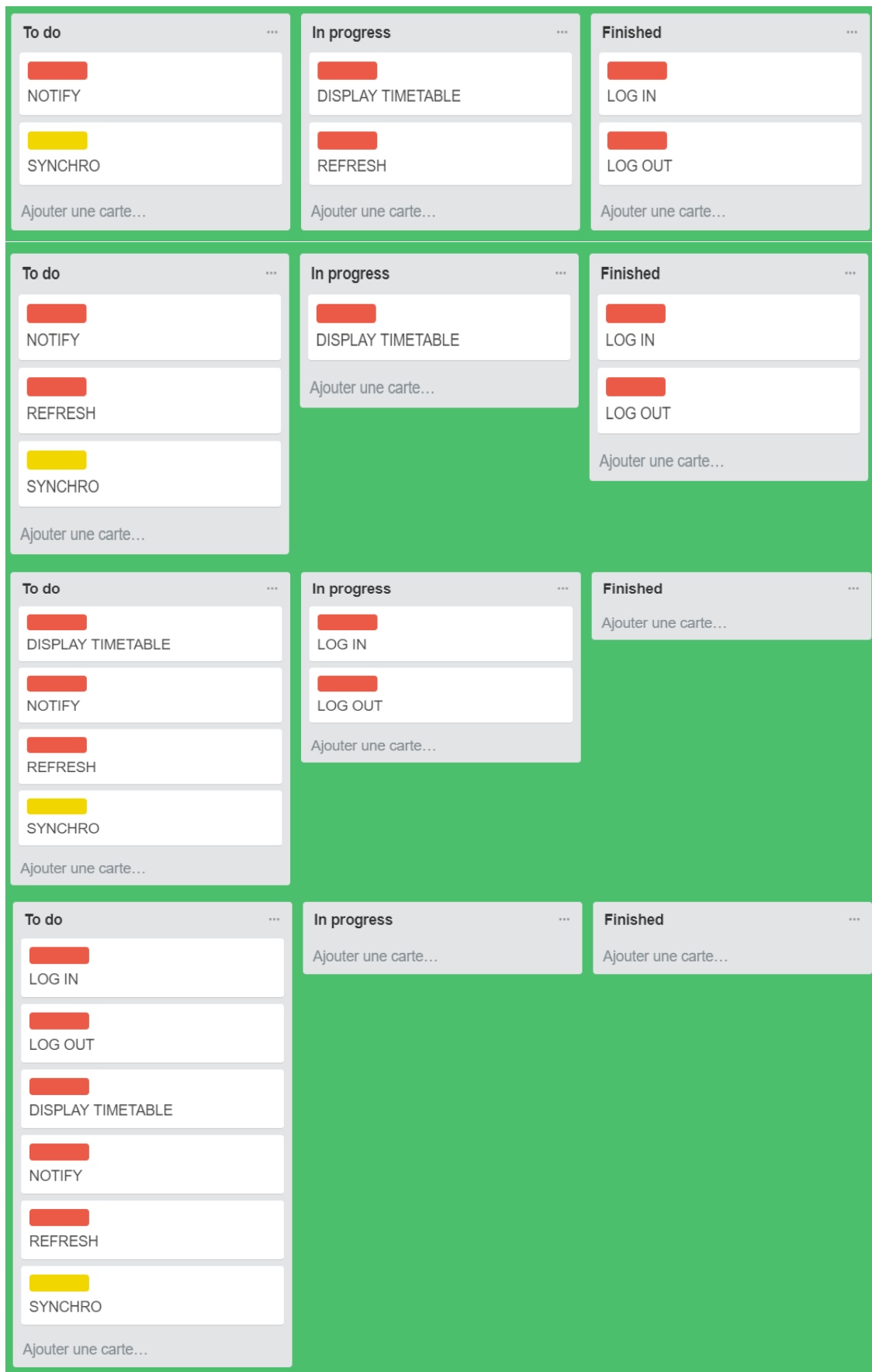
Finished

LOG IN

LOG OUT

REFRESH

Ajouter une carte...



07/04/2018

Dear Sir,

Please find below my service proposal for the realization of the project.

I thank you for this opportunity and assure you of the importance I attach to this mission.
I hope that the terms of this proposal will receive your approval. If so, I would be grateful if you could send me one of the two signed copies.

I remain of course at your disposal to answer all your questions.

Thanking you for the confidence you will bestow on me on this mission.

I beg you, Sir, to accept our most cordial greetings.

Mr. Wafi GRISSI

Customer organization

- Identification :
 - School of Computer Engineering
- Interlocutors :
 - Mr. Fernando Alvarez Garcia
 - Mr. Luis Vinuesa
 - Mr. Daniel Fernandez Lanvin

Project

- Type :
 - Mobile development project
- Context :
 - Validation internship of theoretical achievements
- Deadlines :
 - Start date : 03/04/2018
 - End date : 30/06/2018

Means

- Contributors :
 - Mr. Fernando Alvarez Garcia
 - Mr. Luis Vinuesa
 - Mr. Daniel Fernandez Lanvin
 - Mr. Wafi GRISSI
- Wherewithal :
 - Hardware :
 - Computer with Internet access
 - Printer
 - Software :
 - Microsoft Office pack
 - Android Studio
 - Brackets
 - Eclipse
 - Modelio
 - Trello
 - Github

Note of clarification

Project : Ovis

Context :

As part of a year-end internship, Mr. Wafi GRISSI's project is the realization of a digital space for students allowing access to the schedule and announcements of the secretariat.

Objectives :

- Log in
- Remember me
- Display timetable
 - o Today's timetable
 - o Week timetable
 - o Specific date timetable
- Log out
- Notification
 - o Classes alarms
 - o Secretariat notications
- Refresh
 - o On click refresh
 - o Automatic refresh
- Synchronization

Deadlines :

- Start date : 03/04/2018
- End date : 30/06/2018

Contributors :

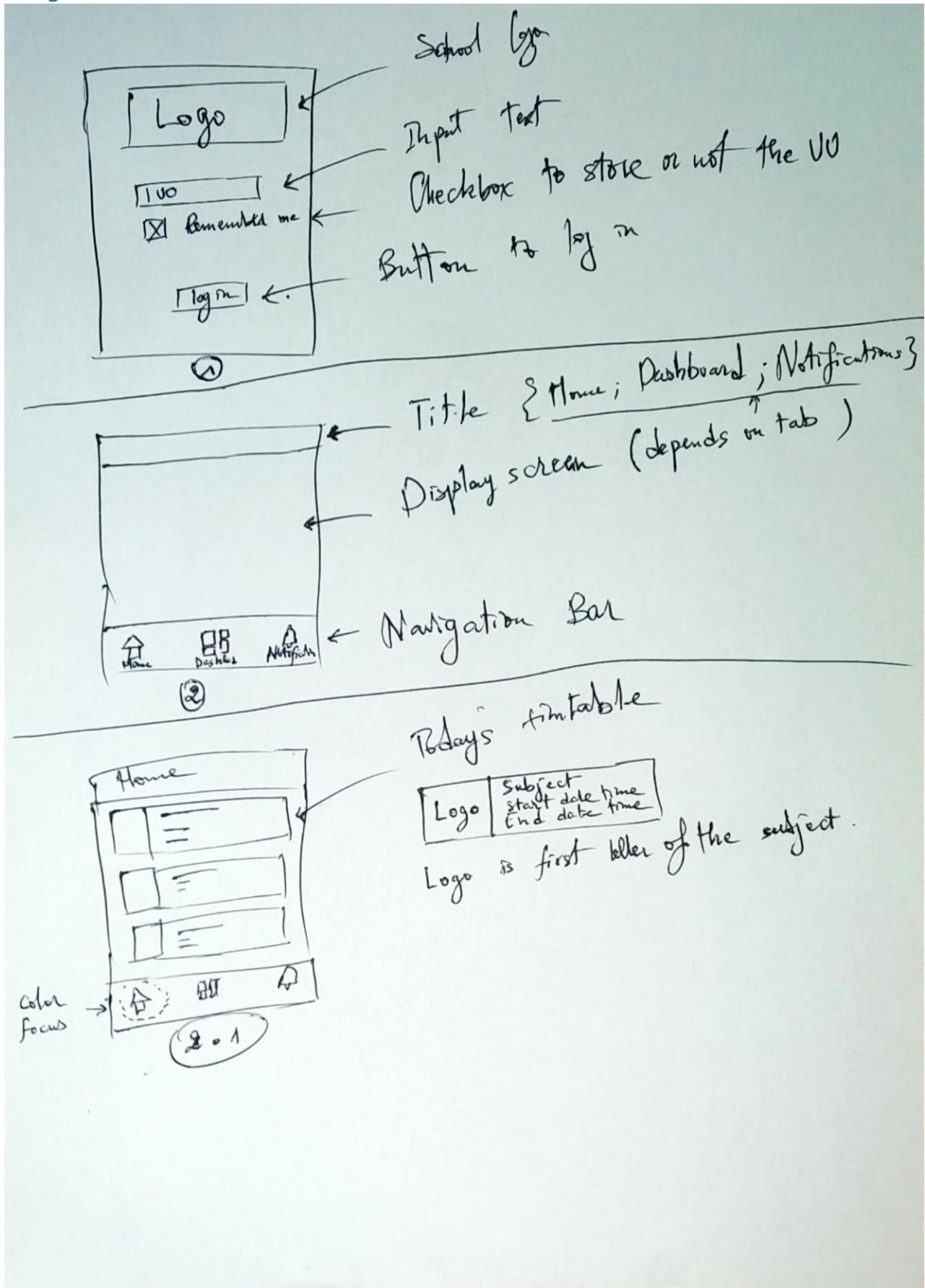
- Author :
 - o Mr. Wafi GRISSI
- Tutors :
 - o Mr. Fernando Alvarez Garcia
 - o Mr. Luis Vinuesa
 - o Mr. Daniel Fernandez Lanvin

Final product :

An Android mobile application allowing users to display timetables and get notifications.

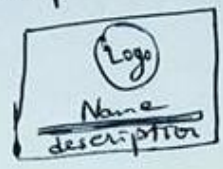
Risks :

- Material risks :
 - o Machine breakdowns
- Human risks :
 - o Lack of experience
- Time risks :
 - o Lack of time





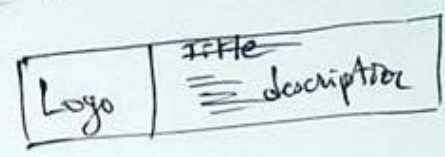
Application features



color focus
2.2

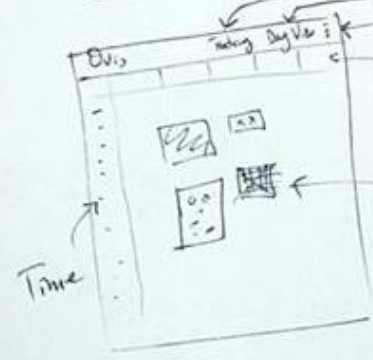


Events (Notifications /)



2.3
color focus

Calendar View:



Go to current day
Select Day View
Mean to select type of view
Date

Timetable