

Project Applied Technology Group Project

ATGP-21-016

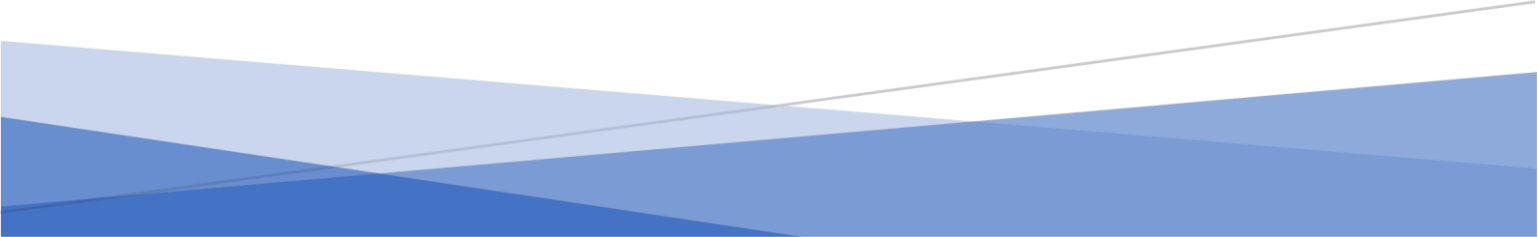
- Arthur T.F. Jardim - 2019376
 - Caue Maciel - 2018392
 - Stefany Alves - 2019307
 - Rolando Leon - 2019337
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Table of Contents

Virtual Leap Card Mobile Application.....	2
Background	2
Objectives.....	3
Goals.....	3
Roles and Responsibilities	3
Developing the application:	3
Security:.....	4
Testing Strategy:	4
User Support and Training:	4
Literature Review.....	5
Development Methodology and Project Plan for the Virtual Leap Card Mobile Application.....	5
Phase 1: Planning	6
Phase 2: Requirements Analysis	6
Phase 3: Design	6
Phase 4: Implementation / Coding	6
Phase 5: Testing	6
Phase 6: Deployment	6
Phase 7: Maintenance.....	7
Virtual Leap Card Mobile Application Software Project Plan and Timeline	8
Individual Self Evaluation – Appendix A.....	9
Individual Self Evaluation – Appendix A.....	10
Individual Self Evaluation – Appendix A.....	11
Group Communication and Activity - Appendix B.....	12
Group Communication and Activity - Appendix B.....	13
Reference Materials.....	14

Virtual Leap Card Mobile Application

Background

The idea for this project originated when it was noticed the needs of citizens for a better, safer, and convenient way of paying for public transportation.

We currently have a software application (App) called Leap Top-Up available for the smart card Leap Card. In the App, the user can make top-ups, buy special tickets, check the last five trips, receive receipts by email, among other functions. Although the App looks complete, there are some limitations for the end-user. For instance, one needs to own a Leap Card and have the NFC of your phone turned on in order to have access to the functions of the app. Which is a great nuisance that impacts the usability of the app.

Another flaw is that one needs to hold on to the actual card when paying for the transport.

In a hypothetical scenario, let's say a person leaves the house in a hurry and forgets the Leap Card in another jacket, and when it gets at the bus stop realizes that the Leap Card is not there with them. This person then wonders "How good would it be to have my leap card on my phone, so that I would never forget it again".

With that in mind, an implementation of a Virtual Card to pay for public transport fares will enable the user to use their own smartphone to make a payment for the transport. Making it safer, easier, and more convenient.

Objectives

Implement a new functionality exploring the use of NFC technology to the already existing Leap Card system by the end of April adding a Virtual Card to improve the application and achieve at least 60% of our goals in 3 months.

- Research (NFC/Virtual Cards/Mobile App Development)
- Development of a Virtual Card
- Create a Database
- Implementation of the new system

Goals

1. Increase the overall use of the application
2. Bring new functionality to the stakeholders
3. Make it more user friendly
4. Get rid of the present limitation

Roles and Responsibilities

Developing the application:

- Coding
- Designing
- Application management
- Troubleshooting, errors that might hinder the performance of applications and Debugging the Application
- Monitoring updates and possible security threats

Security:

- Data should not be shared or exposed to third parties.
- Password, pin, card details should not be exposed during the user interaction.
- User credential should be stored in the app through a keychain or SQL/SQLCipher
- Data should be encrypted
- User authentication
- Authorization

Testing Strategy:

- Directing system testing and validation procedures
- Usability Testing
- Ensure that the app is easy to use
- Test apps performance
- Mobile flow

User Support and Training:

- Manage all elements of training and support
- Develop training videos or tutorials, conducting phone training and support or live troubleshooting of issues

Literature Review

In this project, as listed before, we are trying to create a virtual card to use in buses around Ireland, and to achieve this project we discussed and set that we are using Java language through Netbeans.

Java is the most supported language by Google, with many options, libraries, and community support to make our job easier and it is the main language that we learned at college, we are used to programming using Java.

With his extended libraries, APIs, and easy connectivity with databases, we decided that is the best choice now to use Java, still, we did not discard the options in the future to improve our knowledge and try something new, update or new features using Kotlin which replaced Java as the main language for android apps since 2019.

As discussed previously, the development for IOS is on hold, we need more time and knowledge to figure out how to create our card wallet inside the IOS environment, so for now, the best option is just to focus on android users.

Development Methodology and Project Plan for the Virtual Leap Card Mobile Application

In the process of making a project, it is crucial to have a system of methods to approach any type of objectives that can be comprehensive and persistent with the group or corporation management style. A set of guiding principles that will help to determine how work is completed and prioritized.

As the aim of our team is to develop a **Virtual Leap Card Mobile Application Software**, it is important to follow a structured process that allows the building of high-quality, low-cost software, in the shortest possible production time. This Process Model is called **Software Development Life Cycle (SDLC)** that is overall a traditional methodology used to develop, maintain, and replace info systems that reach and exceed all customers' demands and expectations.

There are seven key points to understand Software Development Life Cycle (SDLC):

Phase 1: Planning

In this phase, the product owner and the customer will define the requirements of the software application. This stage helps to outline the problem and scope of any existing system, also to decide the objectives for the new systems.

Phase 2: Requirements Analysis

The analysis phase includes collecting all the specific details required for a new software application as well as establishing the first ideas for models.

Phase 3: Design

The Design stage takes all the requirements and starts to plan the product. It may include the business rules, the user interface, layouts color schemes, programming languages to use, etc. The software requirement specification (SRS document) is turning into a more logical structure that can be implemented in a programming language.

Phase 4: Implementation / Coding

The implementation stage, known also as the development stage is the part where developers write code and build the application according to the design document in the earlier stage. The operation team will set up the physical hardware for the servers.

Phase 5: Testing

To make sure that there are no bugs and the end-user experience won't negatively be affected the software must be tested.

Phase 6: Deployment

The operations team will end up approaching the development environment systems that we have been testing in and getting them ready for production. Meaning that they will install new servers, new hardware and make sure that everything is scalable for production.

Phase 7: Maintenance

Developers in this stage must move into maintenance mode and begin practicing any task required to handle concerns reported by end-users.

The TFI Leap Card

The TFI Leap Card is a contactless smart card for automated fare collection overseen by Transport for Ireland. It was introduced in the Greater Dublin area in 2011 for Luas, DART, Iarnród Éireann and Dublin Bus, but acceptance has significantly expanded. In fact, it is a very convenient way to pay for public transport across the TFI public transport network. But as the time goes much more in a digital era. There is a need to have a digital card rather than keep carrying a physical card with us all the time.

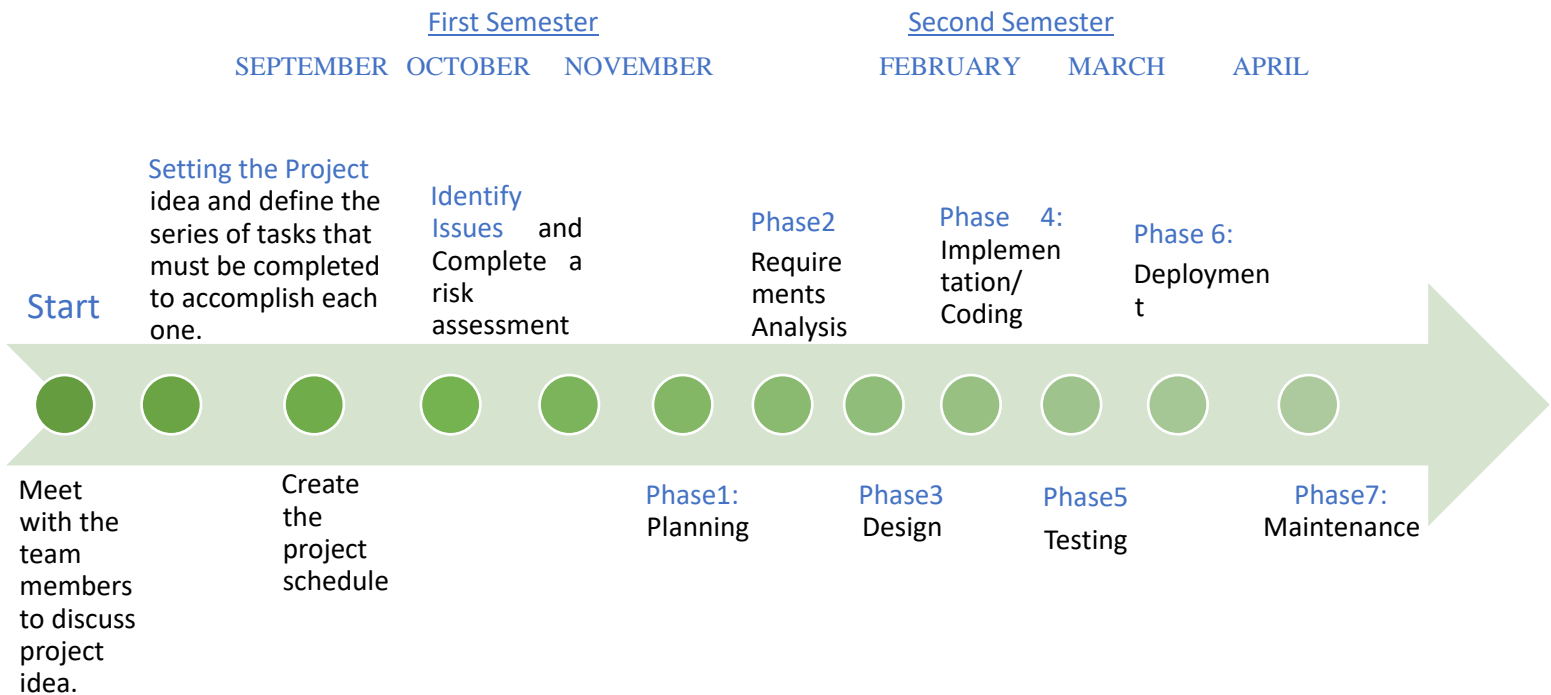
As the majority of the population are getting used to use the contactless mobile payment and are trusting in this new technology, the creation of a “digital card” that allows people to use their Android or iOS phone to pay for their travel fare is needed.

At the moment there is a mobile application called Leap Top-Up that is a free App and if you have an NFC (Near Field Communication) enabled in your Android phone or an iPhone 7 or above you can download the app which allows you to check your balance, collect tickets and instantly top-up your TFI leap Card.



https://upload.wikimedia.org/wikipedia/en/9/9f/Dublin_Leap_Card_2018_new.png

Virtual Leap Card Mobile Application Software Project Plan and Timeline



Individual Self Evaluation – Appendix A

Caue Maciel – 2018392 - Literature Review (including technology choices with justification)

With this project, I was in charge of the Literature Review, and it was a good role, I learned more about all types of features, languages, and development software that we could use. At my research, I found out that we can use a few APIs and how this can be useful for future projects.

The role process to think and choose a project, try to figure out what kind of problems or necessities we can fix or improve helped me to start to think out of the box. Our project is a simple thing that, in all these years in Ireland I never thought about and I use public transport on daily basis and never occurred me how easy can be the life with a simple phone payment method. I am happy with our project, what we are trying to achieve, and the learning process that is coming with that.

Stefany Alves - 2019307 - Roles and Responsibilities

In a project, regardless of its size, it is important that each member involved knows exactly what role they play and what they are responsible for.

A project must have a fixed duration – a beginning and an end. Therefore, it usually follows a few steps that guide him through this process and take him to completion. These steps are initiation, planning, execution, control, and completion.

During the time I spent doing this task, I realized how important is to know what each individual will be responsible for. We were able to spend quality time, just focusing on one part of the project, consequently, we wouldn't feel overwhelmed by the project phases that are separated between us.

Individual Self Evaluation – Appendix A

Arthur T.F Jardim - 2019376 - Project Background and Rationale

• Project Goals / Aims / Objectives

In this project, I was the one responsible for the Project Background and the Objectives.

The whole process of writing it was quite interesting, also I realized how challenging can be to think outside the box, especially when you have to write a document in a foreign language.

This is my first time working in a group, I feel comfortable and happy with our progress until now.

I know that this project will bring new skills and knowledge to all of us, and I cannot wait to learn more. I hope to achieve great results in the future steps we have ahead.

Individual Self Evaluation – Appendix A

Rolando Leon Student Number: 2019337

For our Virtual Leap Card Mobile Application Software Project, I was assigned to two tasks very important. One of them was to choose a Development Methodology in which we can relied on for a good approach to our objectives.

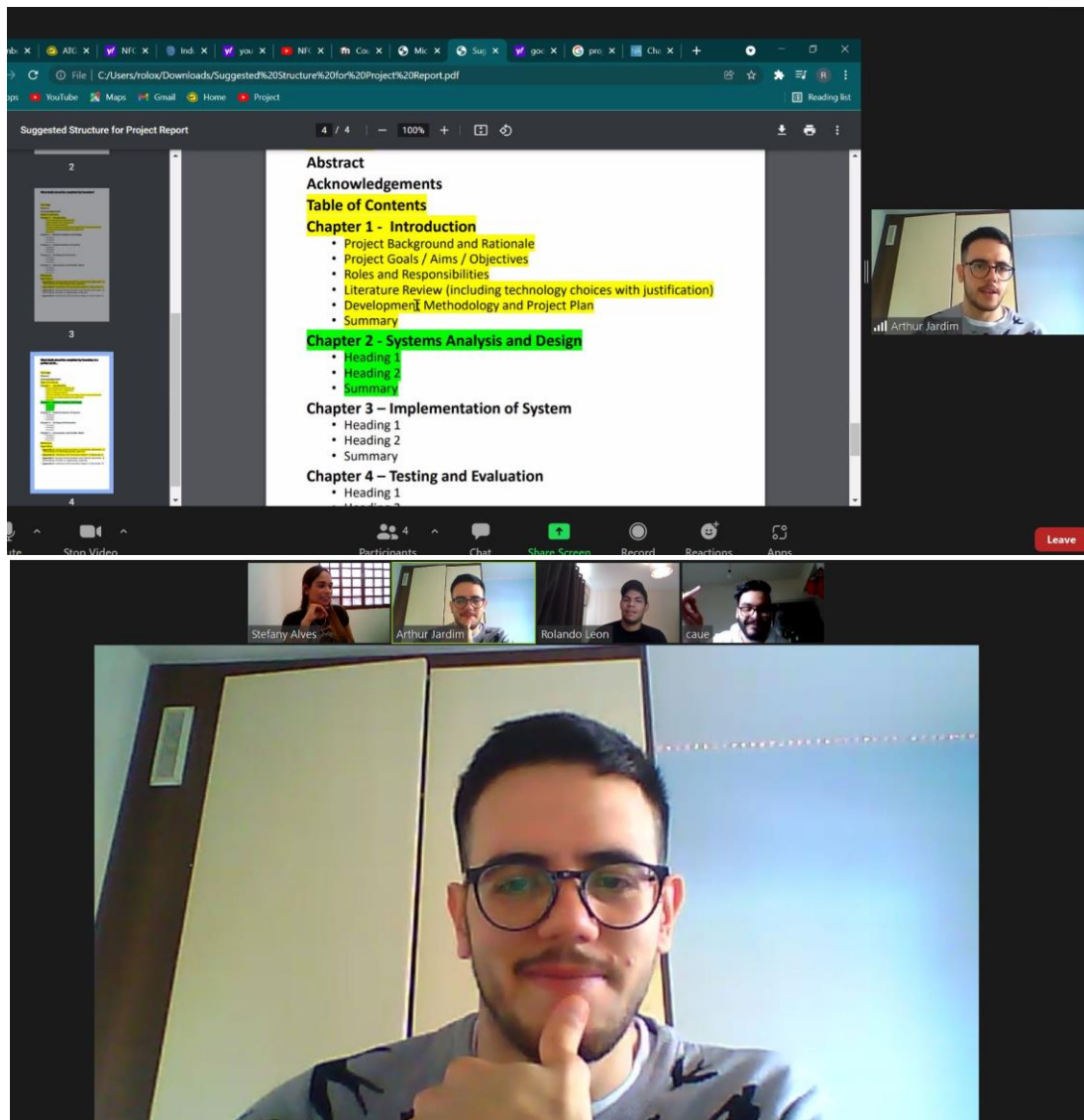
In my view I think my ability and competence to work in a team has improved positively, participating actively in roles that I was allocated to. Also expressing my opinions and some ideas to the group. However, I noticed that I must spent less time trying to do just one task and trying to meet deadlines and objectives on time. When I got stuck with one thing, I tend to not continue the following task until I finish the first one.

I must learn to use resources more efficiently. I should try to show more commitment to the project, but I feel that with the Project Plan, and Timeline Project I have shown motivation. Spending time thinking about how to solve some problems and challenges that could appears in time of the Project. I might try harder to encourage team's values in terms of collaboration and boosting team spirit. When it comes to making decisions. I make a logical assessment of the positives and negatives. I do consult some research documents and look for advice to make an informed decision. Time management is one of my weaknesses.

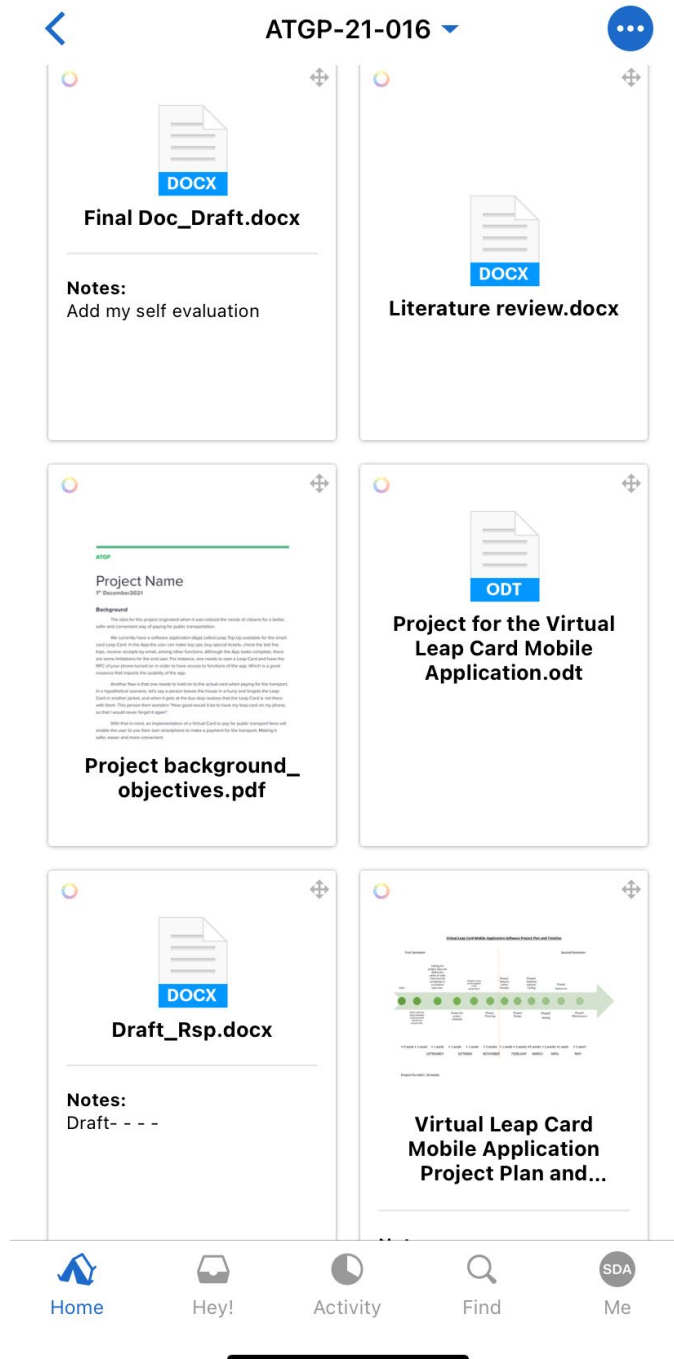
I should improve my ability to arrange the most important tasks and if I struggle with them, I will ask for help to one of the team members or delegates to others who have experience. I have valued debate and conversation among the team members within our Zoom calls. I have enthusiastically listened to my classmates and adapted myself to any changes we must make.

Group Communication and Activity- Appendix B

Appendix B: Group Communication and Activity (Semester 1) - Screenshots of stuff, Basecamp, code etc.



Group Communication and Activity- Appendix B



Reference Materials

- Agile Methodology - <https://www.wrike.com/project-management-guide/faq/what-is-agile-methodology-in-project-management/>
- Roles and Responsibilities - <https://its.weill.cornell.edu/guides/project-roles-and-responsibilities>
- Planning the project - <https://mikhail-cct.github.io/projskills/wk3/#/>
- Leap Card Transport - <https://www.transportforireland.ie/fares/leap-card/>
- NFC - <https://www.androidauthority.com/what-is-nfc-270730/>