# ENSE 405 Project report-out & lessons learned

## Project name
Fairtrade Certification Management System - Mikayla Peterson

## Project sponsor & course facilitator
Dr. Tim Maciag (ENSE 405 professor)

## Business need/opportunity
Fairtrade is an international standard that is used to regulate the growth of key individual ingredients in particular products as well as the regulation of the product itself in several areas including trade and production of the actual product. The application process to become a Fairtrade ingredient producer can be daunting and it can be difficult to keep track of what documents and information that you need to provide to the certification body, as well as when you need to supply up to date copies of these documents. The certification must be continually renewed, and the certificate holder can be audited at any time.

The complexity of the application process is partially due to the sheer length of the standards documents (40+ pages) and the language used in them. Fairtrade does not appear to offer any assistance with helping producers organize and keep track of these documents. Documents required for this certification are simply emailed to the appropriate licensing body and then the licensing body follows their own internal application scheme.

Since it is critical to keep track of these documents and it can be difficult to navigate the standards document, there is an opportunity to make an application that helps the producers keep create and keep track of these documents as well as specific dates related to the certification process.

## Reflections on project planning
### State and discuss the United Nation's (UN) Sustainable Development Goals (SDGs) selected and your "why" for selecting the one(s) you did

The two SDGs I selected were SDGs 1 and 12, No Poverty and Responsible Production and Consumption, respectively. I chose to focus on these two since I wanted to do something focused on Fairtrade due to my involvement in trying to get the University of Regina to become a Fairtrade certified campus, and Fairtrade primarily focuses on these two goals and touches on a bunch of others.

### Discuss key findings from your community research and understanding/requirements gathering (Community characteristics and technology configuration inventory)

The special need that I found for my community is that the individual producers are not necessarily new to producing, they are new to the certification process. Members of this community range from the owners of the farms, people who help on the farms, up to co-operative owners. Owners are the most active participant when it comes to managing their farms. As for their baseline technological skills, they can use the Internet, word processing tools, spreadsheet software, and have general basic computer literacy. Since owners are more focused on running their farm, they may not have a high capacity for learning a complicated piece of software. The countries that they are in might have limited access to the Internet, hence it was important to me that the application stores everything locally. This is why I was so insistent on using SQLite since it can store data locally and does not require the user to install separate database software and it does not require access to a server. This is also important since owners may not have a lot of time to be online while they manage their farms. The community orientation is 'Service Context' with 'Organization as Context' being the main

variant. This is because the mission of the community is to produce products in a sustainable and fairly traded manner, which is critical to the fundamental ways the community operates. Prior to making this application, the main pieces of technology smallholders use are spreadsheet software, word processing software, and email clients. There was a pilot program for an internal management system that was run by Fairtrade back in 2020, but I have not heard any public updates about this, so I am unsure of how successful this project was. These tools are used for general farm management purposes (I.e. estimating crop outputs and tracking farmer attendance) and are not specific to becoming Fairtrade certified. I did find that the documents helped me gain an understanding of my community since I did not have direct access to my community members. I also found that they helped me figure out what exactly I wanted to build; I just wish these documents were due a little earlier in the semester.

### State selected north star & carryover customers. Why are these customers important to your project's golden circle (why, how, what)?

My north star customer was the owners who are directly managing their farms. Carryover customers include co-operative owners. These customers are important for my project because the main purpose of my project is that I wanted to lower the barrier of access to becoming Fairtrade certified with my project.

### Summarize assumptions made and constraints uncovered, re: drafting an emerging picture
The major baseline assumption that I made is that all community members have some form of device, whether that is a mobile or a desktop-based device and know how to navigate it. I was also assuming that the users would have an idea of what Fairtrade is and intend on becoming Fairtrade before using my app. My app was not designed with the intention of encouraging small holders to become Fairtrade. The biggest constraint that I uncovered through the 'Drafting an emerging picture' document was that it did not want to disrupt the polarities of the community. I felt that it made sense that my communities were more focused on asynchronization, reification, and individuality and that the polarities should be left alone.

### Discuss initial & the evolution of your technology stack selection, drafted prototypes, and initial Minimum Viable Products (MVPs)
Initially I was using .NET MAUI to develop my application. I had originally chosen it because I have familiarity with Windows Presentation Foundation, and they are similar. They are similar, but MAUI has enough differences and quirks that make it annoying to use on macOS and iOS. I tried to work around these quirks, but since I was having so many issues, I switched to Flutter relatively late. My application prototypes consisted of a login, signup, calendar view, checklist view, and an admin view. Login and signup are self-explanatory, but the goal for the calendar view was for producers to be able to see what days they need to have stuff handed in for certification (I.e. my crop plan is due this Friday). The purpose of the checklist was to create an autogenerated checklist of items that had to be completed for certification purposes for the currently selected year. I also wanted to have an admin/settings screen so that users could update their information. I initially had everything except for the admin and calendar screens put together into MVP 1. Everything else was in MVP 2. As I started panicking about not finishing when I switched to Flutter, I freaked out and started working on a little bit of everything and consequently nothing except login and register really work. If I did not freak out and took everything one step at a time, it would have been better. I attached some pictures of my originally planned prototypes.

**Login screen (top left)**

(Logo) Application Name
Login

username: [        ]

password: [        ]

[Login]

Sign Up

Other Link
Flocert
Fairtrade International

*have links to other relevant websites users will need access to*

**Sign Up screen (top right)**

(Logo) Application Name
Sign Up

username: [        ]

password: [        ]

(i) producer Network Location: [        ] [v]

product: [        ] [v]

[Sign Up] [Cancel]

Login

**Dates / Calendar screen**

*...ated ...on is overdue?*

Dates

→ o Event
date/time

Month   Year

| 1 | 2 | 3 | 4 | 5 |
| 6 | 7  2 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14  1 | 15 |
| 16 | 17  3 | 18 | 19 | |

**Checklist screen**

Year: [2023 v]
Checklist for Product Type

Finance
☐ item, date due, date completed

Misc
☐ ____

Show the actual standard for reference?

**Account settings screen**

username: [        ] [change]
password: [✗✗✗] [change]
product: [        ] [change]
producer Network: [        ] [change]

## Reflections on project results

My final product consists of the ability to create an account, login, view the admin screen, add events to a calendar (but not see the events), and there is a non-functional checklist page.

9:58

# Login

👤 Username

🔒 Password 🚫

**LOGIN**

Don't have an account? **SIGN UP**

9:58

# Register New Account

👤 Username

🔒 Password 🚫

🔒 Confirm Password 🚫

**SIGN UP**

Already have an account? **LOGIN**

9:58

# Calendar

➕ 🗑

‹ December 2023 ›

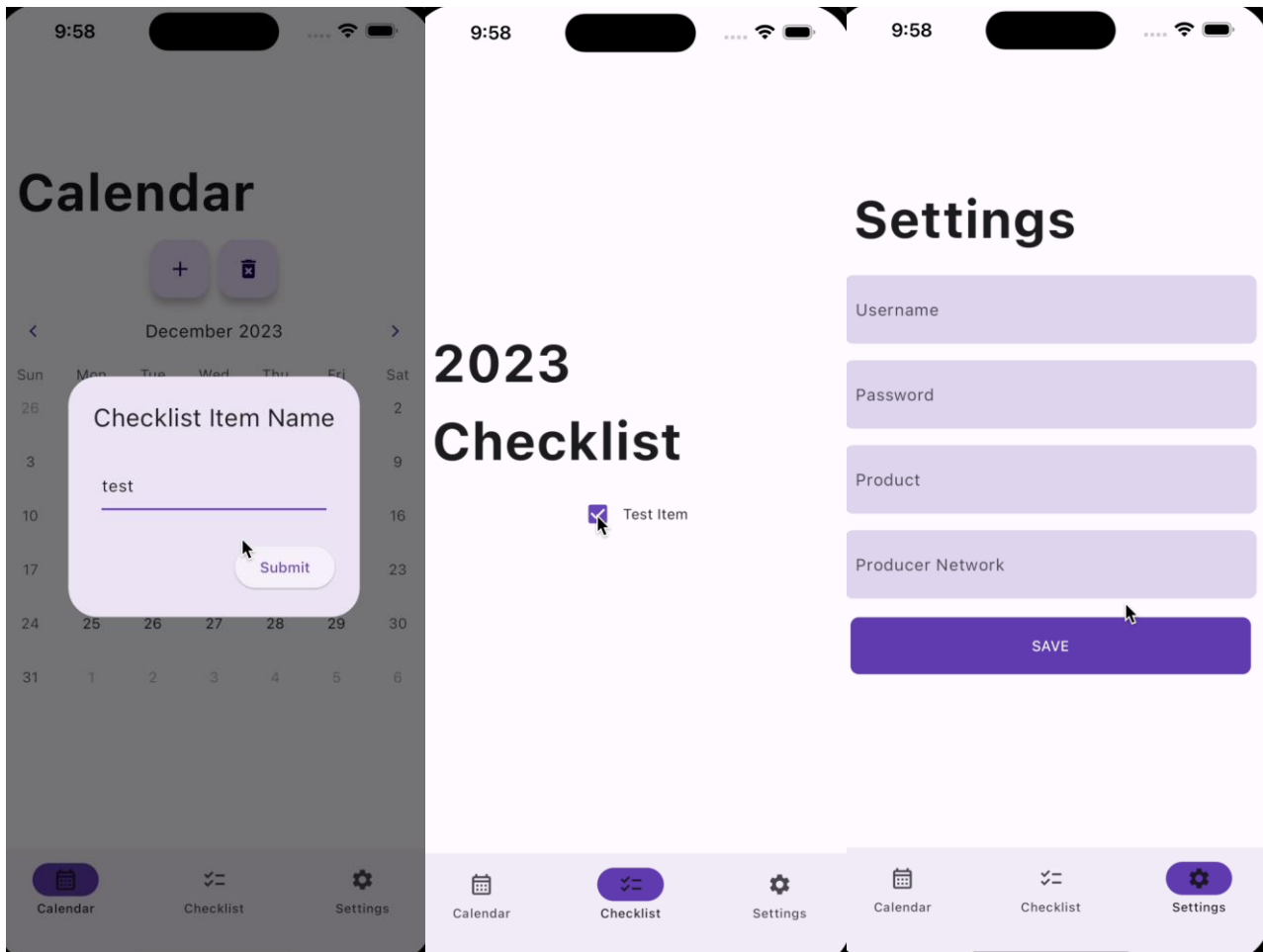| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 26 | 27 | 28 | 29 | 30 | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 1 | 2 | 3 | 4 | 5 | 6 |

📅 Calendar    ✓≡ Checklist    ⚙ Settings

I really did not come close to realizing the solution I had planned. I fell short in many ways. I failed to implement a fair amount of the features, and a lot of this has to do with the fact that I switched technology stacks so late and just ran out of time. My Kanban board has most of these features listed as 'In Progress'. I know I said I would try to get more of it done after the presentation, but I ended up testing positive for COVID the next day and was the metaphorical final nail in the coffin for my project. I have the rough visual code in place for a portion of it, it is just not functional.

**Summarize software design activities and findings. Ensure you discuss how you either linked or envision links to design ideas back to topics discussed in class lectures**

Selecting the Community: I chose my community based on the work I have done with Engineers Without Borders. Community Orientations Document: From this document, I found that my community's orientation is service context because their organization (Fairtrade in this case) serves as the context/purpose of the business. Technology Inventory: I found that there was a piloted internal management system created by Fairtrade in 2020 to aid in the overall management of small holder farms. I also found that they use word processing software, email clients, and pdf viewing software to manage their farms. Business Case: I weighed the options of making a mobile/cross platform app, a web app, and not doing the project. I decided on making a mobile app that could be used offline since my north star customers might not necessarily have steady access to the internet. Stakeholder Analysis: This is where I identified my north star customer and my carryover customers.

Drafting an Emerging Picture: This helped me identify what my community really needed to support them in getting their Fairtrade designation.

Architectural Diagrams: I more so used this as a rough idea to figure out what tables I would need and then refined my actual architecture as I saw fit during development.

Lofi Prototype: These were rough sketches I made to get my main ideas and general layouts sorted. I veered away from this in some areas to make development slightly easier towards the end when I was rushing with Flutter.

The two major ideas I implemented from the lecture are Quality Management Systems and Knowledge Management. The Fairtrade certification standards are essentially a quality policy, and my application is intended to be a system that enforces that policy. As for knowledge management, my application is supposed to help small holders organize and keep track of all their documents (and hence knowledge) about their farm's Fairtrade certification application progress.

**Summarize how you felt about this project (likes/dislikes), from your experiences with the technology stack selected, translating prototypes into real solutions, and the creation/realization of your MVPs**

I would argue that nothing really went well during my project. The only thing that went somewhat well was the planning documents and some of my UI looks okay. I liked my project a lot when I was initially planning it, I was inspired and really motivated to work on it. It went downhill from there. I had a lot of problems going on in my personal life this semester/year and as hard as I tried to keep them separate from university and work, those problems began interfering with my ability to do well in my classes. I like that I had the opportunity to explore new tech stacks and I feel like I have gained enough fundamental knowledge about .NET MAUI to be able to use it out in industry despite having to switch stacks for this project.

In all honesty, I do not have enough words to describe what did not go well during this project. The biggest overall problem that I had was that I was too stubborn and switched my tech stack way too late. If I did not switch my stack so late I would have more of a completed project. I also had problems trying to figure out how I should reduce the scope of my project, and consequently did not really end up cutting anything out because I could not figure out what to cut out and still have multiple MVPs. I also vastly overestimated how much work I would be able to get done on this project on my own. Cross platform development was also trickier than I expected. Using .NET MAUI for iOS and macOS was not the best experience. Mackenzie and I have discovered during capstone that MAUI has a few quirks on Windows, and we are steadily working around them. I discovered that it also has several quirks (I.e. Data bindings between UI controls and the backend not working as expected) on macOS and iOS and it does not feel polished/mature enough for iOS and macOS development. I should have done more research on this during the initial planning stages. I feel indifferent towards Flutter; I do not have anything particularly good or bad to say about it. I have only a little bit of experience working with Flutter, so I felt like I deviated a lot from my initial prototypes with my Flutter implementation. I really feel like I did a poor job bringing my MVPs to life.

I felt like I took a good approach to the planning documents, and I felt like they were useful, so I would use these documents again in the future to gain a fuller understanding of the problem context if I have the time. As I said earlier, I am stubborn; hence, I would like to take another attempt at using .NET MAUI outside of this class and outside of capstone, so I can really iron out the issues I was having with it. I would be willing to try to use .NET MAUI in another project once I get comfortable with it. My biggest takeaway from this project, is that I should not be so stubborn. Usually being stubborn helps me persist and try to figure out a solution. What I am not so good at is figuring out when I should pivot to plan B and that is something I need to get better at. Something that I need to do differently is get better at asking for help. In all honesty, I do not think I am a strong enough developer to be good enough doing everything on my own; I need that support structure in the form of senior developers/managers because I am not good enough at unblocking myself on my own.

As I said in my final presentation, I do not think I will be working on this project outside of this class, unless I somehow

regain the motivation to fix it and put it on my portfolio. A future design idea might be a way to work on the documents in the app itself. Another idea that would be more useful for co-operators is allowing a single account to manage multiple small holders. Right now, an account can only manage the certification for a single small holder.

## General reflections on the class & project experience

- Before taking ENSE 405, were you aware of the UN SDGs?
  - Yes, I was aware of them prior to taking this class. I have done a lot of work related to the SDGs through Engineers Without Borders Canada and their advocacy profile of work since I joined the organization in 2020.

- Typically, before taking this class, when you engineered software solutions, were you concerned with areas encompassing the UN SDGs?
  - No. They are not something I actively thought about when engineering solutions prior to this class.
    - ENSE 271 Regina Food Bank Online Hamper Ordering/Pickup Website. Although I was not directly thinking about the SDGs at the time, it is related to SDG 2, Zero Hunger.

- Did learning about the UN SDG(s) help you understand better your role and responsibility as an engineer to society?
  - Yes. EWB really focuses on traditional engineering when it comes to SDGs and your social responsibility as an engineer, so having the opportunity in this class to explore the SDGs from a software perspective was valuable.

- What was your experience(s) in engineering your specific software solution to address the UN SDG(s) selected?
  - I feel like in my planning I did an okay job attempting to create a software solution to help address some of the indicators. My overall execution leaves something to be desired, but I tried when I was planning.

- As a future engineer, what are your thoughts on the UN SDGs as a whole? Do you think they can help or hinder our work as software engineers?
  - I do think that they are important, and we should be doing work that aligns with them so that they can someday be achieved. Engineers have the technical knowledge and know how that is needed to create meaningful systemic change through applications and traditional engineering practices. I feel that the SDGs and doing our part to achieve them falls under our social responsibility as engineers.

- Should we use the UN SDGs to guide our work or is our work dependent on customer requests, regardless of the UN SDGs?
  - I feel that both should be considered. It is important to listen to your customers since they are the ones who will be using the software you are making, but if taking the SDGs into account would enhance what the customers are asking for, I think the SDGs should be then considered. Personally, I would never want to work on a project that purposefully counteracts the SDGs.

- Will you use your understanding of the UN SDGs in engineering solutions in the future?
  - Yes, if applying my understanding of the SDGs makes sense in the context of what I am trying to make. If the software that I am working on does not align with any of the SDGs, it makes no sense for me to try to force it to align with them.

- Will your experience learning about the UN SDGs inform your career path decisions in the future?
  - Maybe. If I can find an organization that does work related to SDGs that I care about, then maybe I would consider working for them. I am not a very Entreprenurial person, so I would not go out of my

way to start my own business that develops software to aid the SDGs. I would also consider volunteering at a non-profit whose work aligns with the SDGs even if I would not directly be doing any software engineering related things.

- Provide any other comments on the project
  - In all honesty, the project in this class is not a bad project, I just was not in the best headspace this semester to really do this project justice, and that is why I fell so short. If I had the opportunity to redo this project from the ground up, I would, but I do not. I do regret how I performed on this project.