

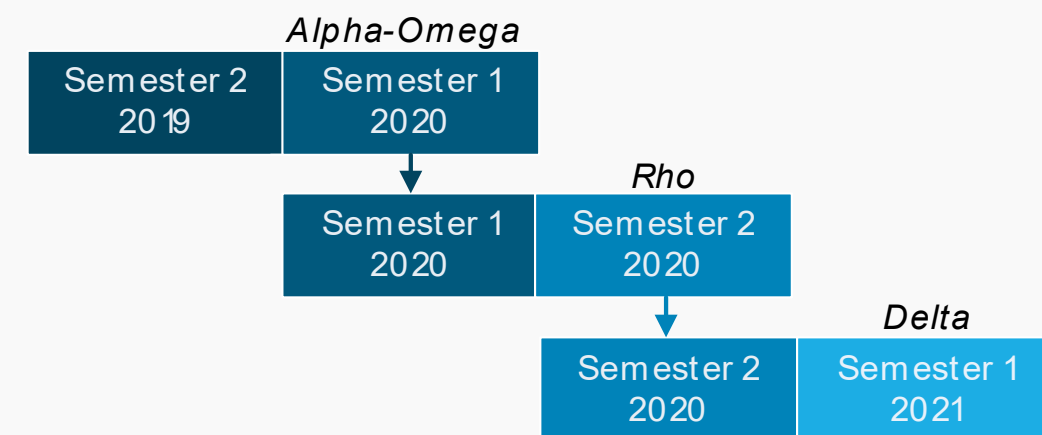
## Background

### About finappster

*finappster* provides a platform designed to allow users to align financial investments with their ethical values. To do this, it presents users with information about potential future investments as well as information around their current investments. *finappster* also enables users to track the performance of their investments while providing insight into the ethical impact of each investment using social, environmental and governance factors. The founder of *finappster*, Leeanna Kohn-Hardy has been collaborating with the Research and Development program since 2019 and has fostered one team each semester, each working on various aspects of the application.

### Existing System

Leeanna's first team, (*finappster Alpha-Omega*), took the existing finappster application (Version Zero) that was present before AUT's involvement and redeveloped it into Version One. Version One addressed issues present with Version Zero, bringing the codebase up to a modern standard. Following this, *finappster Delta* created a production and testing pipeline to facilitate future development and brought the application online, specifically focusing on creating a fluid, usable frontend. Because of this, no further architectural work has been done on the backend, and as such at this point it is antiquated.



As of the start of this project, there is a barebones application online, facilitating tracking of investment performance but nothing more. As such there is a feature gap where the *finappster* product is yet to distinguish itself within the market.

## Project Objective

Our project objective was to:

1. Create and test a set of interface designs including the following:
  - A quiz for investors to complete to determine their individual ethical standing
  - A page for users to view their values as well as the ethical standing of their investments
  - A page for users to view the investments that align most with their ethical standing
2. Develop a system to facilitate suggestion of both share and managed fund investments that align with users' individual ethical standing
3. Test this recommendation system with generated data
4. Provide Leeanna with a tool allowing her to upload both share and managed fund data to the live database
5. Create a set of database documentation for the tables that are currently in use in the *finappster* live database, including those created by the team.

## Process and Artefacts

### Designs

The first issue we tackled was the creation of a set of designs to outline our scope for the rest of the project. We used Figma to create mockups of the pages we would be creating along the project, with the goal to create a standard design principle that could be reused through the site.

### The Five P's

When creating the designs for *finappster*, one of the big design statements we created was "The Five P's". These are Peace, Prosperity, Partnership, Planet and People, and are the broad categories that the UN's 17 Sustainable Development Goals fall into. Our goal was to establish this principle and then use it moving forward through the site, simplifying calculation and display to 5 universal metrics rather than using all 17 sustainable development goals.

### Quiz

Following completion of the preliminary design phase of the project our next task was creating a quiz to estimate a user's ethical standing. We had multiple ideas for this, including creating a survey with multiple choice questions to estimate individual user's standings on the 17 Sustainable Development Goals (SDG) created by the UN. Ultimately, we decided that ranking the goals in order of importance to the individual was the best way to do this. Following this, a user's 17 SDG ratings would be converted to their 5 P ratings for further calculations.

### Recommendation Algorithm

As mentioned above, one of the big tasks we faced was the need to create an algorithm to facilitate suggestion of investments that matched users' values. To do this, we utilized the Euclidean Distance algorithm, comparing the deviation between a user's ethical values and the ethical values of each investment in five dimensions, one for each of the five P's.

### "Real-Enough Data"

Another concept the team pushed with Leeanna is that of 'Real Enough Data'. This involved a set of sample data that encompassed all possibilities—ranging from companies with perfect ethics all the way down to ones with awful ethical performance. The use of this enabled testing of the recommender system, and it was only through this process that the final algorithm was decided.

### Data Upload Application

The final issue the development team faced was that of getting usable, meaningful data into the system to facilitate further testing. Ultimately it was decided that the best way to proceed with this would be to create another web based application that Leeanna could use to upload share and fund data. This would then perform basic error checking on the input tables and upload them to the database.

### Database Documentation

A major issue that the team ran into over the course of the project was the lack of documentation for the *finappster* database. To combat this, one of the deliverables we presented was a set of documentation, including an ERD of the current tables being used within the *finappster* database, as well as documents outlining the intent of each of these tables, a small ERD for each of them showing any direct relationships and a table defining each field within.

## References and Acknowledgements

finappster. (n.d.). Finappster. Retrieved May 24, 2022, from <https://app.finappster.co.nz/dashboard>  
Kmhkmh. (2018) Using the Pythagorean theorem to compute two-dimensional Euclidean distance. Retrieved May 25, 2022, from [https://en.wikipedia.org/wiki/Euclidean\\_distance#/media/File:Euclidean\\_distance\\_2d.svg](https://en.wikipedia.org/wiki/Euclidean_distance#/media/File:Euclidean_distance_2d.svg)

A big thank you to Badger Dowdeswell and Leeanna Kohn-Hardy for their constant support and encouragement throughout this project.

## Challenges

### Non-Technical

A big challenge we ran into was the complexity of both the client's needs and her business model. This is still a work in progress, but it is something that will need to be addressed within the near future. For this project to surpass being just a project and become an actual product, it is imperative for her to define a concrete business data model. This was evident throughout development, as our scope changed drastically as Leeanna further understood the business problem she was attempting to solve.

The other main non-technical issue we ran into involved a disagreement with the client about how exactly the math worked when changing share ethical values into fund values. She had an extremely complicated Excel™ sheet that she could use to perform these calculations, but it was infeasible to attempt to understand it given the time limitations we faced. Ultimately a simple calculation could be performed, multiplying a fund constituent by its contribution percentage to calculate the ethical impact of the share on the fund.

### Technical

As there have been multiple previous teams working on the *finappster* codebase, there was a significant amount of legacy code present within the app. A crucial challenge involved upskilling ourselves to understand both the code and the frameworks that were used when creating the app.

We had several challenges involved with the data platform of *finappster* as well. Initially, there was no existing database documentation, so we had to establish what data went where within the existing database.

After this, we were challenged by the requirement to create a recommendation algorithm. We bounced through a few solutions before settling on the Euclidean distance algorithm we used in the final solution.

In the final stages of the project we were asked if our solution could facilitate uploading large quantities of share data in one go, but this was outside the original scope of our solution. Both the backend architecture and cloud hosting platform did not support this, and as such our app has a limit of 2,000 shares that can be uploaded at one time.

## Future Progression

The completion of the first iteration of the recommender system gives Leeanna a product that begins to set her apart from the other players in the market.

One of the major steps she needs to take to progress from here is utilisation of a future team to refactor the backend. *finappster Delta* effectively accomplished this with the frontend but the backend structure is archaic and needs refinement given the future plans she has for the project.

The *finappster* project is also nearing the time where permanent, full-time employment of a development team capable of giving this project their undivided attention would be wise. The ever increasing scale and imminent need for long-term support availability is something that students are unable to properly provide.