



## COMPUTING PROJECT II

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# **Graf Us : An investigation into networking through SNA**

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*Group Members:*

Rahul Mohite, Richard Emmerton, Santiago Lopez, Asaph Kalala, Fabian Simon

*A Computing Project II Report  
for BSc Computer Science Degree  
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Introduction : In this report we aim to see how social network analysis can be used as a possible business model. In the process of perusing a suitable business model we decide to create a social media platform based on data from Linked In to allow people to see their connections. We explore the process of how social network analysis can be used to help people network and make connections.

Problem statement : Linked In is a social platform commonly used for networking. When using Linked In for networking a limitation of the platform is that you are limited in the connections you can see at a given time making it difficult to see the big picture when looking at your connections. That is where Graf Us comes in. A social platform that allows you to visualize your Linked In connections.

Definitions :

SNA : Social network analysis

MVP : minimum viable product

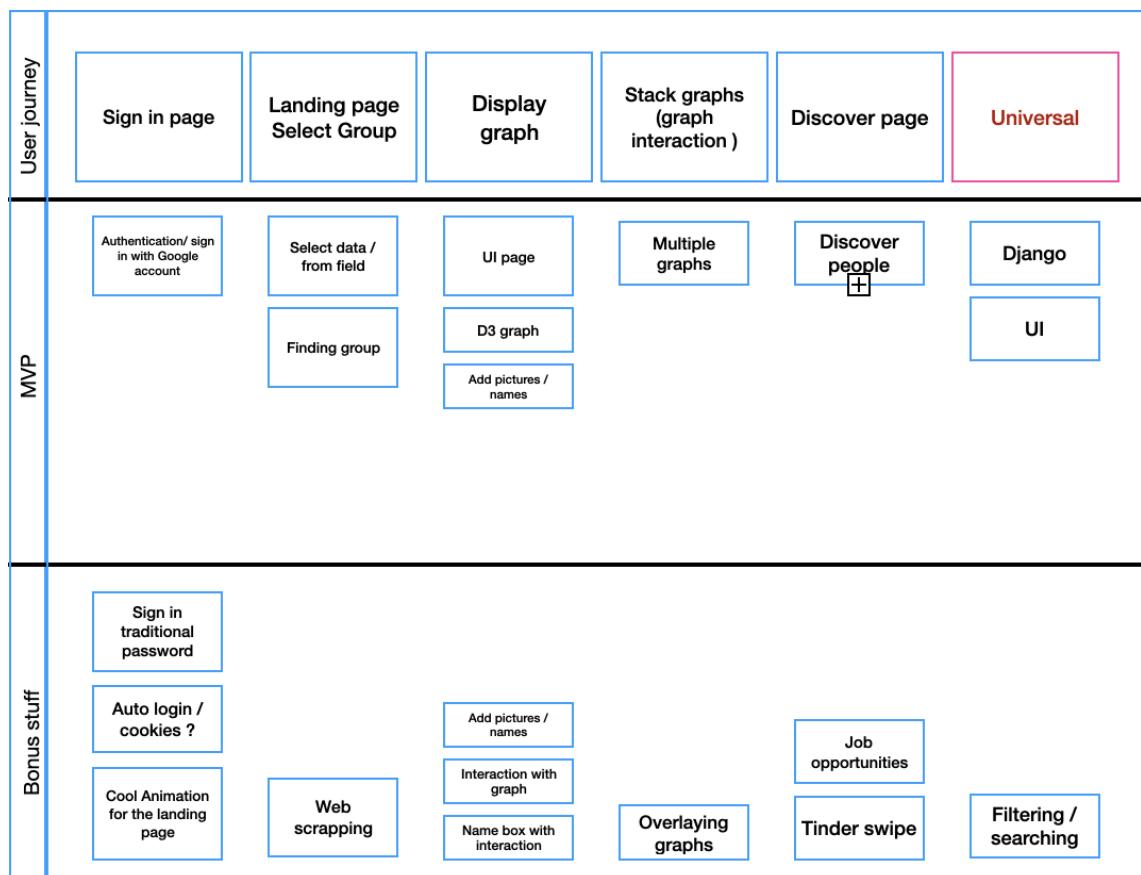
Cluster / grouping : Groups of people who are connected through shared values or spaces.

Stories : Is a collection of goals that are related to each other which have been completed over time.

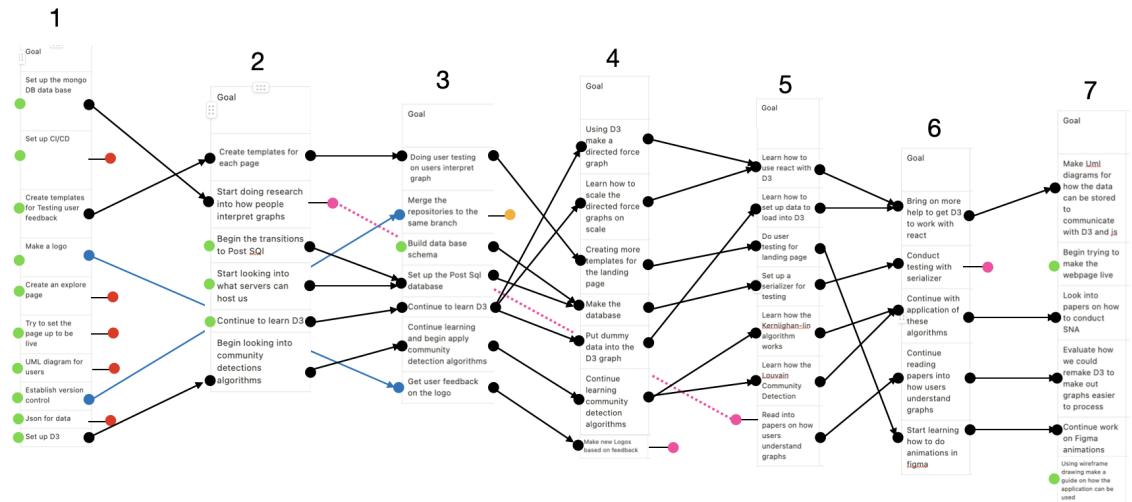
Team work velocity : A sum of all the stories over a certain iteration

## Planning

Initial planning and road map



Reality of project development : (still changing)



## Project management style :

Why did we chose the Kanban

For the project we decided to go with a Kanban because of it is an incredibly simple tool to use but very effective at keeping track of the project and more importantly it communicated information well.

Because the Kanban was so simple as a group we were able to bring a cork board to each of our meetings and were able to create the weekly Kanban without any hassle. The simplicity of the Kanban also meant that the learning curve for picking up this mangement style was very low and did not require training each team member on how to use it. The only training that was required was on the part of the team manager who could use the Kanban to apply an agile style of working. The training was only needed to apply an agile style of working.

We did consider using a Scrum but because the Scrum has more components to it, implementing it would require each team member to be educated on how to use it. The extra components of the Scrum would also have to be established each week which would have slowed down the flow of the meeting when setting up the cork board. Using a scrum would have been suitable if the team was any larger however, our team is rather small with only 5 people and our relationship as close friends meant that communicating information was very easy which removed the need for an in depth Scrum.

## Issues with project management :

Issues that we had as a group was assigning tasks each week and creating a predictable work pace. This was because each team member has commitments to jobs outside of university which impacted the amount of work each person could take on over time. This resulted in a varying amount of availability each week

This is discussed further in the weekly reports by the team manager. The more in depth discussion can be found in week 5 when going over the methodology for calculating the work load.

## Market research

There appears to be a lack of alternative options for people who want to have a visual oversight of their network. The only serious work done in this field was done by LinkedIn with their IN Maps tool. This tool was discontinued in 2014.

The fact that the tool was discontinued in 2014 does raise some concern. However, LinkedIn released some advertisement in 2011 where they revealed that one of the top questions they received from users was what did their network look like. There were also a number of blogs that were writing about the need for such a tool and a number of smaller services that could make a visual graph for you.

We are not entirely sure why Inmaps was removed but a statement in 2014 mentioned that they were looking for new ways to visualise networks. We hope that we can make a more intuitive way to see a network.

## Tech stack chosen

For Graf-us, it has been decided to use ReactJS (JavaScript) for the front-end and Django (Python) for the back-end. In terms of the database, PostgreSQL is the main goal, as of now, the application is running in SQLite.

Why was it chosen

ReactJS was chosen due to its popularity, community and reliability.

Django uses the Python programming language. Django was chosen due to its simplicity and capabilities - it allows for rapid application development.

PostgreSQL is a powerful relational database management system. However, for testing purposes, SQLite is the database currently being used.

Alternatives we looked at

Flutter - After looking into flutter the team was not knowledgeable enough in Google's Dart language. Compared to ReactJS, it was also not as popular, which would translate to reduced support from the community.

GraphQL - The aim of the Graf-us application is to connect, visualise and analyse users. Graph theory would have added a layer on top of data handling, but also on complexity and over-engineering, hence, it was taken off the tech stack

## **Technology for the frontend:**

For the frontend we decided to go with the React JS framework. To help speed up our process we then decided to use the Chakra UI component library.

- React: It's a fast and flexible approach to create dynamic web applications. It's free and open source and maintained by Meta. Furthermore, we wanted to keep open the possibility of creating a mobile app, which is an easy task with React, since you can reuse most of the codebase for mobile development.
- Chakra UI: It is a simple, modular and accessible component library, specifically made for React JS. This way we were able to build a functional frontend for the MVP fairly quickly

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### Alternatives:

- Flutter: For the frontend/app development we also considered Googles framework Flutter. It essentially works similar to React JS but is mainly used for mobile development at this stage. The current version states that it's stable for web development, but React JS is just much more stable and established

## **Technology for project management**

For the project we decided to go with Notion. This is because Notion has a board view which visually looks like a Kanban which allowed us to implement the Kanban easily. In addition to this each story we would have on the Kanban could be a document meaning that documentation could be left on the story. This made keeping track of documentation a lot easier because it was all in one place.

## **Business Plan :**

Initial business plan :

Our initial business plan was dependent on providing consulting services along side with creating a platform. You can find a more in depth explanation in week 5

Final business plan :

For our final business plan we decided to focus on just creating a platform. Our justification for this can be found in week 6.

## **How our project is novel**

Our project is novel because when trying to create a platform to provide SNA analysis to our users we had to create a dynamic system that could provide up to date information as more users join the platform in addition to adjusting to additional data the user may have added. The reason this makes our project novel is there no other applications on the market currently that try to do this. In addition to this when researchers use SNA the analysis is normally done on a static data set. Because we wanted to focus on a dynamic data with methods to add and change data over time this made our project unique in its ability to do analysis.

In addition to this SNA is used in academia for research. Our work would be one of the first attempts to conduct research into how to make SNA can be based around user centred design. There has also never been a social media platform that has been based around SNA making this approach novel as well.

## **How to read the report :**

Each week contains comments by the project manager which includes how we approached the tasks that given week with some justification on the over all approach. In addition to this some weeks contain issues that came up within group development and approaches to addressing this.

This is followed by a summary of team engagement and collaboration to help keep track of the overall well being of the team and the synergy of the team.

A Kanban is created each week to have a visual representation of each of the goals each week to get a quick overview of progress.

To see a more depth explanation of progress we have filled out the Goals table were we justify our actions and collectively create a metric for progress.

## **Table template :**

Goal	Reason	How to measure success	Assigned to
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At the end of each week or at the start of the next week we then went through a group evaluation to discuss our progress. To measure success each team member would pitch the level of progress out of 5. 5 being the goal has been completed, from 2-3 would show partial progress and scores of 1 or 0 would show little or no progress. The team would then discuss if the self appointed score was justified and a final score would then be recorded.

Scores of 4 or more would mean we could continue onto the next stage of development. Scores of 3 or less would need to be continued the the following week unless it was agreed that the goal was not achievable at this time.

After each goal was evaluated we would then as a group discuss possible next steps :

#### **Evaluation for progress table :**

Goal	Grade out of 5 for success	Justification of success	Next steps
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## **Week 1 report**

#### **Project manager comments :**

For the first week of the project we have tried to assign as many tasks as each person is happy with. This is to be able to get an idea of how many stories each person is willing to take on and out of all the stories that are taken on how many of them are completed by the person. By being able to find the boundary of work early on we are able to calculate a team work velocity.

#### **Review of team work collaboration :**

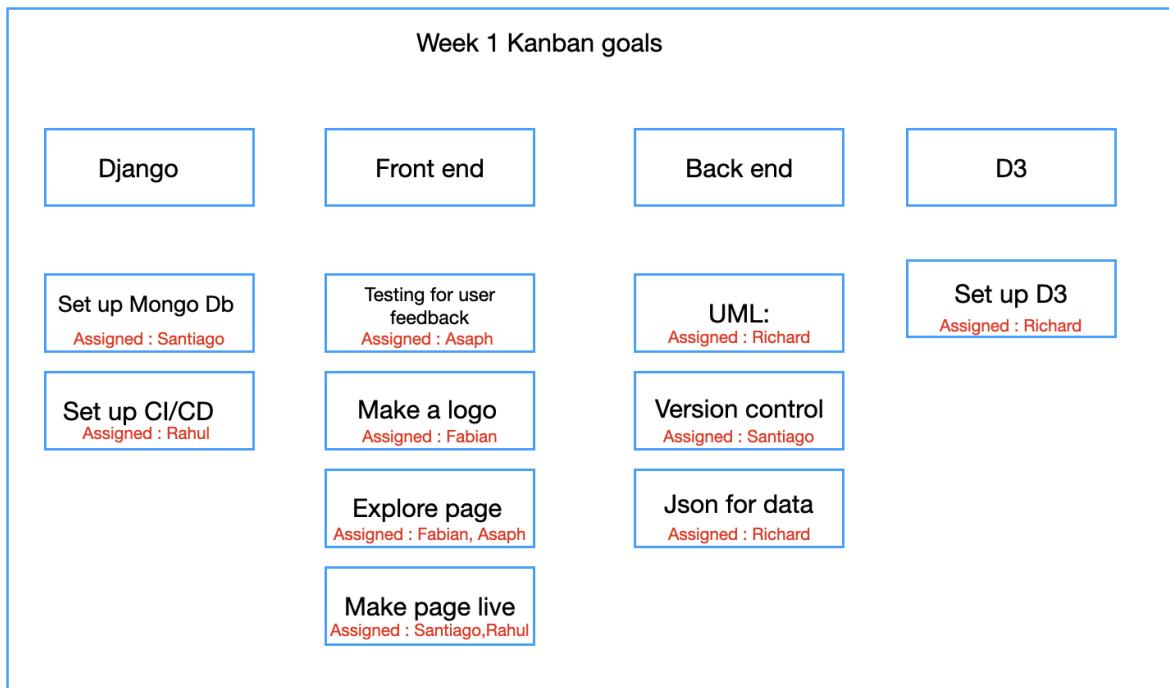
The team collectively appears to be very excited to to get started with the project and everyone on the team was engaged with the meeting. Brining a cork board really helped motivate the teams engagement in discussion and going forward we plan to continue using the cork board when discussing ideas.

#### **Goals :**

Goal	Reason	How to measure success	Assigned to
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Set up the mongo DB data base	We need to be able to store data based on each user	To have a database set up that can be uploaded to a server	Santiago
Set up CI/CD	This is to assist with communication between team members	To have a method to apply CI/CD	Richard
Create templates for Testing user feedback	To get feedback on initial drafts to see how users react	This is to be able to feedback from users to guide future designs	Fabian/Asaph
Make a logo	To create a sense of identity for the group	To have a logo at the end	Fabian/Asaph
Create an explore page	This is to allow users to explore new connections	To have a draft of the explore page	Fabian/ Richard
Try to set the page up to be live	This is to be able to have a live mvp early on	To be able to have an early on MVP which we can develop	Rahul / Santiago
UML diagram for users	This is to see how we can store the data for the users	We will have a UML diagram for the backend team to create data bases around	Richard
Establish version control	This is to be able to track the different versions of code that we have	To have version control set up on Git HUB	Santiago
Json for data	To be able to have the data in a format that can be translated between languages	To have a template the Json data	Richard
Set up D3	This is to have a visual library for our graphs	To begin becoming comfortable with the D3 library	Richard

## Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for level of success	Justification of success	Next steps
Set up the mongo DB data base	1/5	We have decided to switch to a different database system	Begin looking into post SQL
Create templates for Testing user feedback	3/5	We have one template that we can test	To test users based on the template
Make a logo	5/5	We have a logo now	
Create an explore page	0/5	This was too broad a story.	Come back to this at a later point when other parts of the application are developed
Try to set the page	2/5	We have got a domain and some back end set up but still need to make progress	Come back to this at a later point when

up to be live			development is further along.
UML diagram for users	0/5	We do not have a diagram. We do not know what data we need	To do further reading into what fields we may need for each user
Establish version control	5/5	We are now set up of Github	To continue with using Github
Json for data	0/5	Without knowing what data we need to store we cannot make a Json template	To come back to this when we know what data we need to have
Set up D3	2/5	We have done some learning with in D3 but a far away from being able to use it. D3 is a much more complicated library than originally thought	To continue learning with D3

## Templates

### How will we test users with the templates

With each template, we will be conducting testing where users are encouraged to guide us through their thought process aloud. Using attitudinal research methods helps in gauging product performance in the market against the user's needs, satisfaction and overall user experience, therefore guiding us in the future design of the product.

## Logo

### Inspiration

We had a lot of ideas for the logo. We wanted it to be minimalistic, simple yet elegant. We wanted it to incorporate graphs, connections and just a human touch.

### Color Scheme:

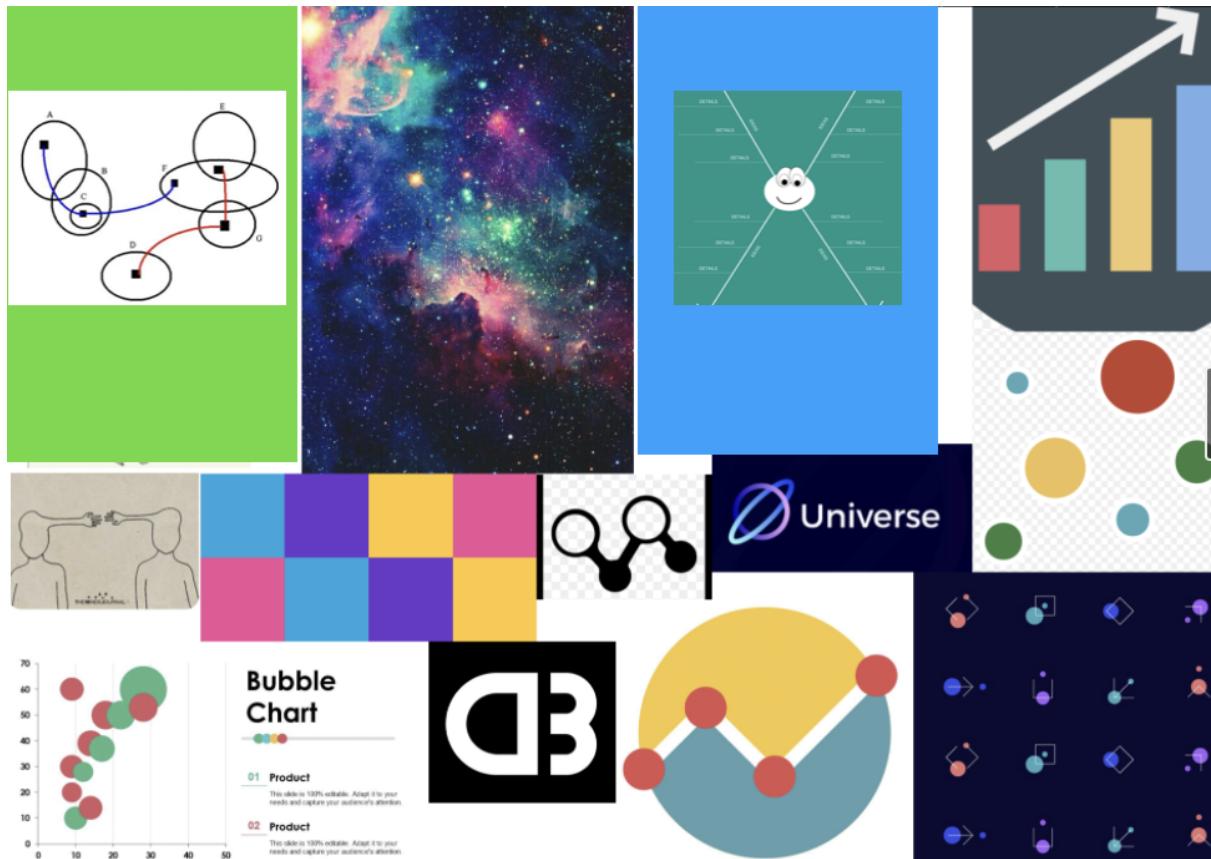
We played around with a few color palettes, but we decided to go with the one that came with the UI library and just tweaked the colors a bit. That way we ensured that the logo will fit flawlessly with our frontend design.

### Logo aesthetic:

We decided to go with a minimalistic design, for various reasons. The most important being flexibility. When we first sketched out a logo, we didn't quite know

how our final frontend will look like, so we aimed for something that is easily adjustable

## Mood board

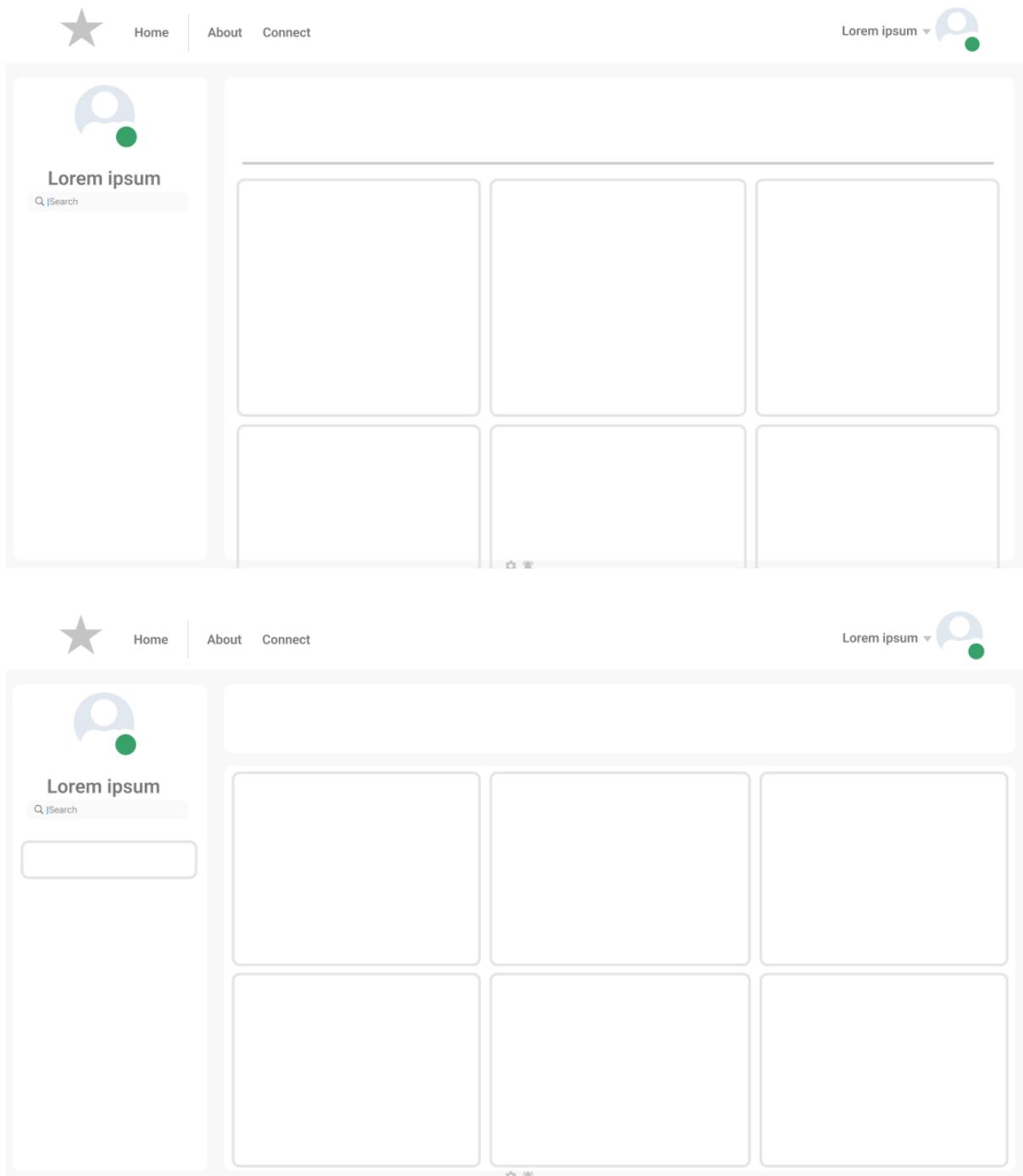


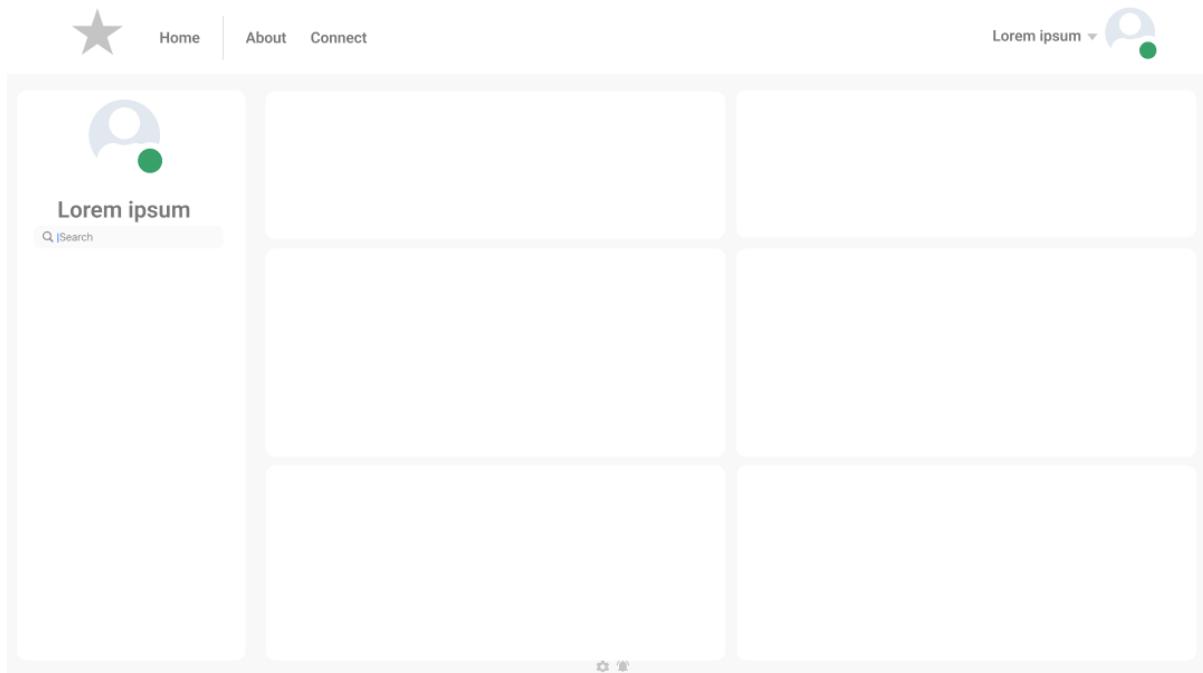
## Current Logo :



## Wire frame for the explore page

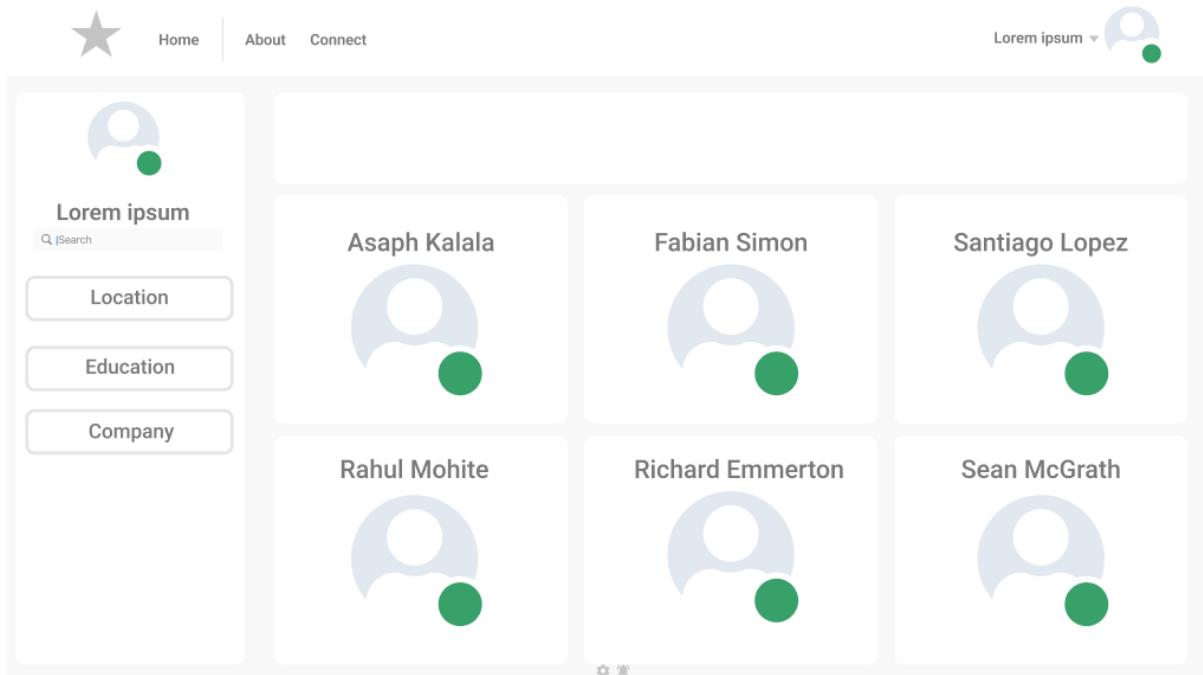
We also conducted A/B testing with a small focus group, where we presented the users with three alternative layout designs so we could determine what their preferences were.





Through this method, we were able to determine the following requirements for the explore page:

- Users loved how straight-forward the designs were. Users felt that these simple layouts will make navigating the website a lot easier.
- Some users felt that the first and second layout were essentially the same, they suggested that I move the search bar of the second layout and remove the user profile grid completely.
- They thought the user profile was taking too much space on the page; more space should have been dedicated to other profiles on the explore page.
- All of the boxes in the grid should be made smaller to fully utilise the space on the explore page, so it encourages the users to actually click on the profile.
- Users would prefer the user profile to be a rollover tab as opposed to it being part of the grid.



The majority of the focus group believed that the third layout option would make the most ideal explore page. Taking into account the users preferences, we made a few changes to how we approach the layout design. Users showed a preference for the third option as there were clear segmented grids, which they felt they could be able to easily to navigate their way to other user profiles.

## Justification for Making live project on private domain:

Planning to setup project on own domain so we bought the domain <https://graf-us.co.uk>

As we plan to get server but the private space of server is expensive so try to manage get shared server which wasn't supported functionality like PostgreSQL database and Nodes Modules installation so we skip that part.

## How did we establish version control

GitHub was chosen for version control for our code.

## Why did we chose Github:

We decided to opt in using GitHub as it is the version control platform most of the team is comfortable with and it is easily implemented in other servers with the command "git clone"

### **Github, how did we do this:**

We created a private repository to store our codebase and keep track of all our changes. Invited all team members and set up a rule for changes to be approved by at least 3 out of the 5 members before they can be moved to the default branch, currently "Version-1"

For documentation and shared notes we used Notion.

### **Why Notion ?**

Notion was a platform that we all had experience with meaning that the learning curve to set up and share resources was low compared to other platforms that were available. Notion also had a variety of ways to format information which made it easier to communicate information when documenting out work.

### **Json for the data**

In a group meeting we came to a conclusion that we would be communicating information between different languages. To be able to be able to communicate information to the front end we established that we would need to reformat any information we had into a JSON format. We set the goal to create a template for the JSON data. We did not achieve this in the first week because we had tried to create a model for the data before we knew what data we needed to collect. Without a clear direction this goal was unachievable. As a result we have decided to pause this task until we know what data we will need to have.

### **Getting started with D3**

#### **Why did we chose D3 :**

D3 is one of the most common and one of the more powerful libraries that are used to create visualizations for the web. Why did we consider D3 a powerful library? D3 is a library that is reliant on the use of SVG images and allows you create SVG images in a very flexible way to create a range of data visualizations. Because of its use of SVG's it can perform very well when creating complicated visualizations. The flexibility in the library also gave us room to create our own data visualizations.

In addition to the flexibility there was already a D3 library we could use for our visualizations. By using D3 we could save resources in development.

The library we had in mind is called the force directed graph made by Curran. This library was chosen because we can create graphs that are interactive. The performance of the graph was much more preferable to other options.

link to Github : <https://github.com/d3/d3-force>

D3 is also a JS library which allows us to process that data visualizations on the clients end which removes the burden to process any data visualizations on our end.

### **Concerns on choosing D3 :**

D3 has a steep learning curve when, which may be very time consuming to learn. A concern for the team is that in order to use D3 we may have to allocate a lot of resources to be able to use D3. The library made by Curran was also more niche than other options. This could result in it being difficult to find support online if we ran into an issue.

After looking at alternatives options we came to a conclusion as a team that D3 was worth allocating resources in order to learn and use on the site.

### **Possible alternatives and justification on why we did not chose them.**

p5 was a JS library that we considered using, however p5 does not use SVG to create its visualizations which could harm performance especially when we scale up and create more detailed visualizations. p5 also did not have a library we could use. It would take a lot of resources to be able to develop our own library to achieve what we wanted to do.

Cambridge-intelligence and Beyondanalysis had very powerful tools that had a great deal of support for the tools they offered and would speed development time along very quickly with their use. This is because the tools have done a lot of the work we need to do as a team. However to access these tools you need to pay for them which made unsuitable for our team.

## **Research for the data we will need for the UML diagram**

### **Motivation for our research :**

Each of the users that sign up to our platform will have a variety of different attributes and connections that will allow us to assign them to a certain grouping which we can then visualize. However there are a wide range of attributes that we can select and to narrow the scope of work we will need to do for the MVP we have decided to conduct research into which fields can be selected and which of the selected field would be the most useful.

## Possible fields that we can collect :

Because the data we want to collect is from Linked In we have carried out a case study of Je Hak (Jerry) a Linked In user who works for Wonsulting. This is because he has a role as an influencer at Wonsulting where he advises others on how to use Linked In to make connections and find certain job roles. Because of background Jerry's Linked In profile is a fully developed profile where all possible attributes that can be filled in have been filled in.

Possible attributes we have found :

Fields	Comments about field
Active company	
Headline	description of work at the company
Active company experience	
Current role	
About page	
Featured	
Location	

We have identified a list of potential fields that can be used to group people and have a wide range of different fields the user can select from to identify the different groupings they are a part of.

However from our reading on giving users choice (<https://www.endlessgain.com/blog/is-too-much-choice-bad-for-conversions/>) we can see that providing the user with too many options can be a negative. [1]

To be able to provide users with useful data in a way that is not overwhelming we need to be able to prioritize the most useful fields to show them. To identify which fields would be the most useful we have taken a look at a variety of papers to identify which fields they found the most useful for SNA.

## Research into SNA to identify key fields

### Paper 1 exploration :

Notes on Social Network Analysis in the Science of Groups: Cross-Sectional and Longitudinal Applications for Studying Intra- and Intergroup Behavior by Ralf Wölfer, Nadira S. Faber, and Miles Hewstone [2]

Context for the paper : This paper has been used as an introduction into how to conduct research into SNA and gives an introduction on how to conduct the

research and how the research can be used to assist in other fields of research.

### **What can social network analysis do ?**

SNA can be used to do analysis on the on human social structures. Specific elements of human social structures that can be identified and analysed with SNA include identity, conformity, **leadership**, group decision making, **group performance**, group socialization, **intergroup contact**, and **in-group** versus **out-group** behavior.

This can be done by mapping out links (connections) between people. This allows for structural patterns in between social connections to begin to form and we can start to see patterns emerge.

The use of graphs also allows the application of network theory in order to show relationships and inter-dependencies or intra-dependencies to explain the behaviour of the network.

Once we are able to identify the flow of resources we are then able to identify individuals with salient features.

### **Ways to collect data**

We can collect data through the following methods ; observations, questionnaires or archival analysis that asses some kind of interdependency information .

Graf Us will take advantage of archival analysis because most of the data on relationships will come from Linked In. We may also take advantage of questionnaires to attempt to fill in gaps of data or to gain more in depth insight in an area of interest.

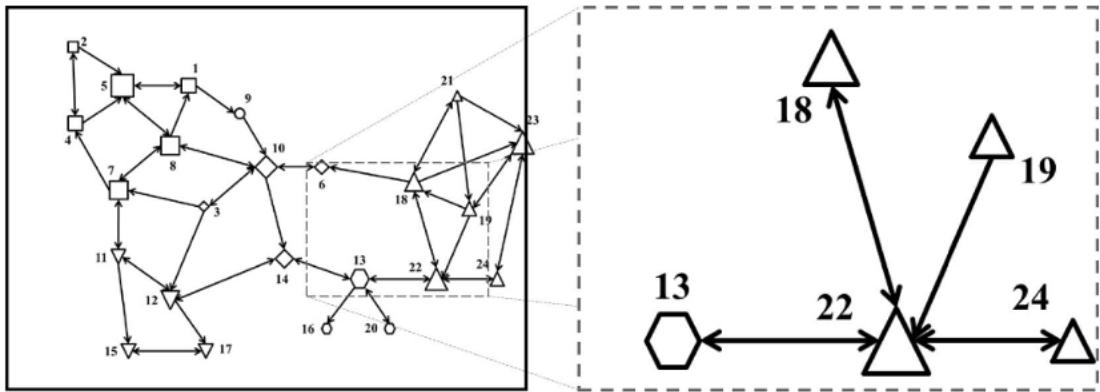
After all the network data has been collected the information can be entered in a statistical program as directed or undirected graphs.

Directed graphs can specify relation between nominations A or whether A and B are reciprocally connected.

Undirected graphs only indicate the existence or absence of a connection between two members but also more valuable information that is of a specific interest for many analysis questions.

### **Understanding the network at different levels**

Figure 1



*Figure 1.* Left: Complete social network; Right: Ego network of network member #22. Nodes represent network members whose size is proportional to their indegree and whose shape denotes their group membership (the circle is an isolate with no group); lines represent relationships that are connected by double-headed arrows in case of mutual relationships.

### Individual level N-step ego network

The individual level takes a specific individual and their connections. With this data we can create what is called an ego diagram where the ego refers to the specific individual. N defines the links from the ego.

Ego diagrams show how the individual interacts with the group but can lose key details because the data is dependent on a single individual. Detail can be enriched with a two degree ego which also allows you to see the centrality of the individual.

The parameters for an ego diagram were established by Freeman in 1979.

### Group level

We can look one level up from the individual level and we can begin to see structures of a group level. In SNA we can refer to these groups as clusters.

When talking about groups/clusters we often refer to two definitions which include the group and the out-group. The group is the grouping which we are looking and the out-group are those that are not in the group.

Once identifying the clusters this can allow us to spot latent structures between clusters. This can be done by identifying the strongest connections in a network in addition to being able to identify isolates.

One method to identify clusters is the [social cognitive mapping](#) (Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988) for data produced with a group nomination

technique and the hierarchical clique clustering *approach* (Everett & Borgatti, 1998) for data produced with an individual nomination technique

With social cognitive mapping individuals are asked to nominate others. This can show which members belong to the group

### **How to store the data on a group level**

The data can be arranged in a matrix that connects the members in the groups.

We can find intercorrelations with in the matrix Members with high intercorrelations can be grouped together and non overlapping members can be coded as discrete clusters.

Cairns and colleagues (1988) as well as in Gest, Farmer, Cairns, and Xie (2003) looked into this idea

The analytic unit of a clique is defined as the maximum number of network members who have all possible ties person amount each other.

r (Luce & Perry, 1949). That is, if A is connected to both B and C, which are in turn connected among each other, then A, B, and C would constitute a clique.

This could form a triadic closure (look into )

By identifying groups you can examine the flow of information

### **Network level**

The final level, describes the overall structure of the social network. The purpose of the graph parameters is two fold. They can be used as control variables for researchers who look at different networks.

In addition to this they can allow for the contextual routes that recourses follow.

Parameters that can be measured : density, reciprocity, centralization EI index

Density reflects the overall connectedness within a network by relating the number of existing ties to the number of theoretically possible ties between all network members. Reciprocity specifies the number of mutual relationships by measuring the extent of bidirectional connections. Centralization indicates the variance of centrality within a social network by determining the difference in the network members' number of connections

E-I Index captures the contextual network connectedness between two groups by subtracting the number of out- group ties from the number of in-group ties and

dividing this difference by the total number of ties.

We can see how information is distributed and process by groups.

### **Methods to measure centrality**

The centrality a person has (1 measurement is the number of connections a person has) can be mapped on a graph where the size of the node reflects the number of connections. This can show how central a person is.

"Bonacich's centrality measure takes these indirect relations into account by considering the number of someone's connections and the number of connections from those to whom someone is connected"

### **Limitations**

Analysis of social structures needs to go beyond the scope of the defined social structures in the graphs.

You can get much more informative details once researchers integrate external information. SNA is very open to external sources of information.

Suffers from missing data. Because of nonparticipants the way the network is mapped can be affected. Especially true in central networks.

This needs to be taken into account before any analysis can be done

limitations

If our information is limited we cannot see their connections to others.

This might lead to issues when trying to prioritize people of importance on our network

Possible look into : SIENA (focuses on *network dynamics*, which examine the extent to which individual characteristics affect the network formation.)

SIENA is a SNA tool made by Oxford to perform SNA analysis.

### **Reflection of the paper in regards to Graf us :**

To allow our users to use SNA in their daily lives we will need to create ego diagrams that can show their connections. To be able to do analysis on a larger scale in order to identify key connections we need a method to identify possible

clusters. One method is the social cognitive mapping method made by (Cairns, Cairns, Neckerman, Gest, & Gariépy, 1988).

The information can be stored inside of a matrix.

### **Paper 2 exploration :**

Notes on Social An Experimental Study of the Small World Problem by Jeffrey Travers and Stanley Milgram Dec, Sociometry, Vol. 32, No. 4 (Dec., 1969), pp. 425-443 [3]

Stable URL: <http://www.jstor.org/stable/2786545>

Context for the paper : This paper is considered one of the most fundamental papers to the field of SNA. This paper was made by the well known psychologist Stanley Milgram who established and conducted one of the first experiments to give evidence for the six degrees of separation theories.

In the paper Milgram conducts an experiment where he gives a number of different letters that start at different geographical locations and are given to people who work in a number of different fields. These individuals would then need to pass the letter on to a person at a random location.

In the results from the paper Milgram was able to identify a number of factors that helped contribute to complete chains.

The first was that the individual had to be motivated to participate in the experiment. Out of the 297 starting individuals 217 took part.

The second was that once receiving the letter the given individual adopted a strategy to be able to get the letter to the other end.

The path had to be relatively short between the start and the end individual.

With the 217 participants 64 letters were able to reach their destination. Out of the 64 recipients further observations were made. Out of the 3 random locations two sizable groups were responsible for completing the chain of connections.

These two groups were those who shared a similar geographical location and those who worked in the same industry.

**Reflection of the paper in regards to Graf us :** When selecting different fields to decide on which groups we should focus on the location and the industry that the person works in play a more important role to linking connections over other possible fields.

Although this is a single paper many paper that have been written have based their ideas on this paper and location and industry continue to play an important part in more general reading.

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## Week 2 report

### Project manager comments :

Team work velocity looked good. Increase the work load to test limit

### Review of team work collaboration :

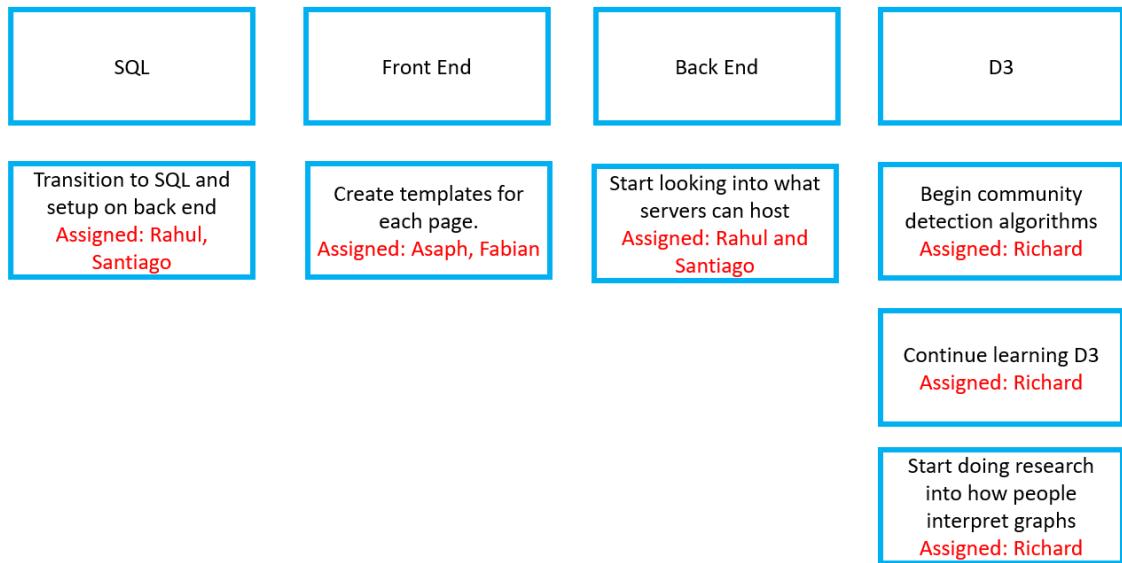
The team collectively at this point are still very excited to get engaged and are enjoying the exploration of different tools that we can use for the project. There is a healthy amount of discussion about each technology which we are considering.

### Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Create templates for each page	To create a wire frame for each page	To act as a reference for those developing the front end	To have a wire frame on each page	
Start doing research into how people interpret graphs	Do general reading and take notes on key papers	To get some insight into how people view graphs and to act as a starting point for our work	To have insight into how graphs are interpreted	
Begin the transitions to Post SQL	Set up post sql on the back end	To use a more suitable data base system	To have post sql set up on the back end	
Start looking into what servers can host us	Do research into our options	To see which option would be best to host our web page	To have decided on a service to host our website	
Continue to learn D3	To continue learning about the library	To be able to use the library	To have a better understanding of D3	
Begin looking	To light	To be able to use	To have an idea	

into community detections algorithms	reading about the subject	algorithms to identify possible grouping that could be important	about what community detection algorithms are
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## Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Create templates for each page	5	We have templets now	Do testing to see how users respond to our templets
Begin the transitions to Post SQL	3	We have made progress in getting started with the transition to SQL but still need to set up the data base fully	To fully set up the data base
Start looking into what servers can host us	5	We have a list of servers we can use	Set up the servers with the correct libraries

Continue to learn D3	2	Progress in learning is slow. The library is more challenging than expected	Continue to work on D3
Begin looking into community detections algorithms	4	We have an idea of the community detection algorithms out there but we need to see which one is the most suitable	Pick a community detection algorithm

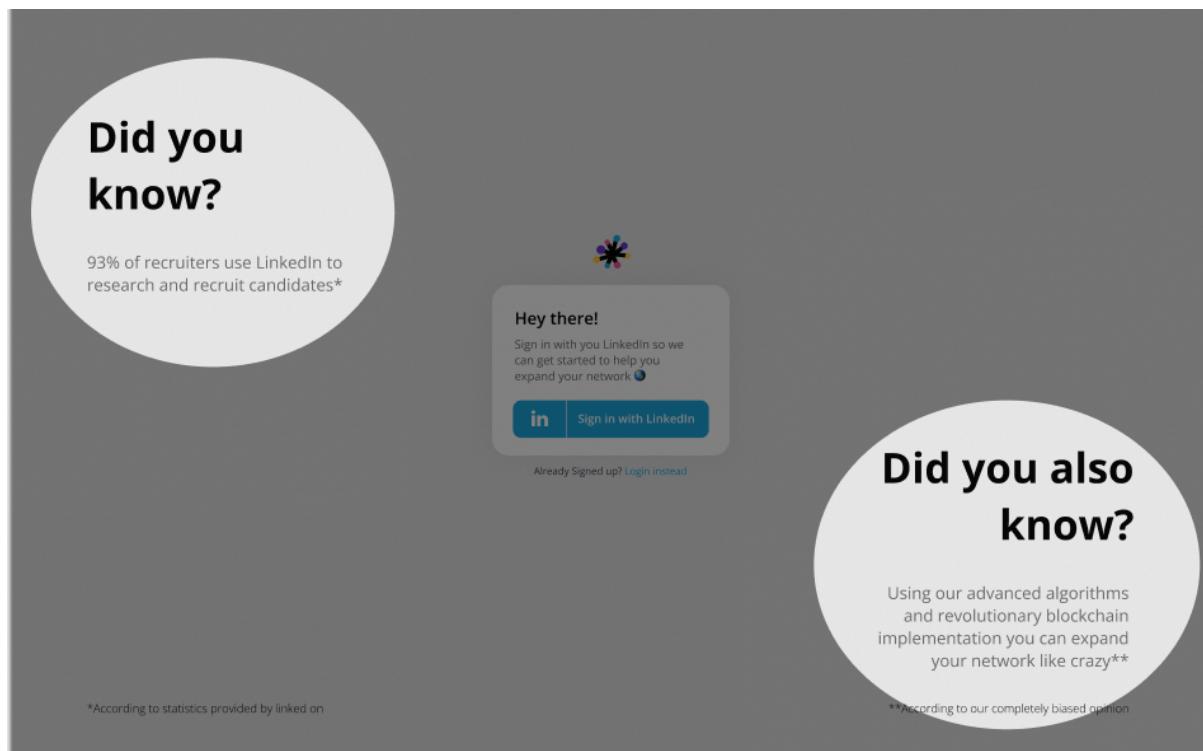
## Design :

### User Journey:

#### Landing Page:

1. One of the first things the users see, is **why** they should use our product.

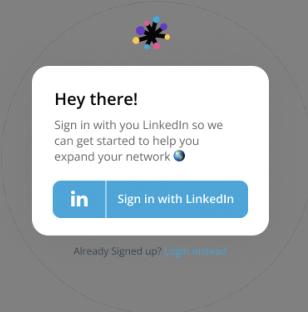
We show statistics on **who** important LinkedIn nowadays is. Especially for young professionals



2. After that first selling point we encourage Users to immediately **sign up** for our service. On the whole page there is only one **button** which gives the user just one option.

## Did you know?

93% of recruiters use LinkedIn to research and recruit candidates\*



## Did you also know?

Using our advanced algorithms and revolutionary blockchain implementation you can expand your network like crazy\*\*

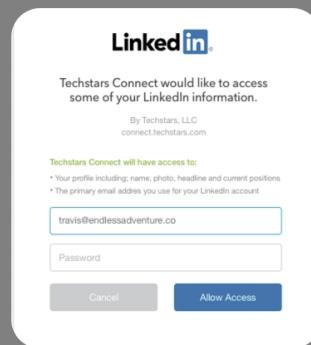
\*According to statistics provided by linked on

\*\*According to our completely biased opinion

3. By using the LinkedIn service as our Authentication Provider, we make the initial sign up feel like a **tiny stepping stone**. That way User tend to stay more on the website, instead of leaving after seeing several formulas to fill out

## Did you know?

93% of recruiters use LinkedIn to research and recruit candidates\*



## Did you also know?

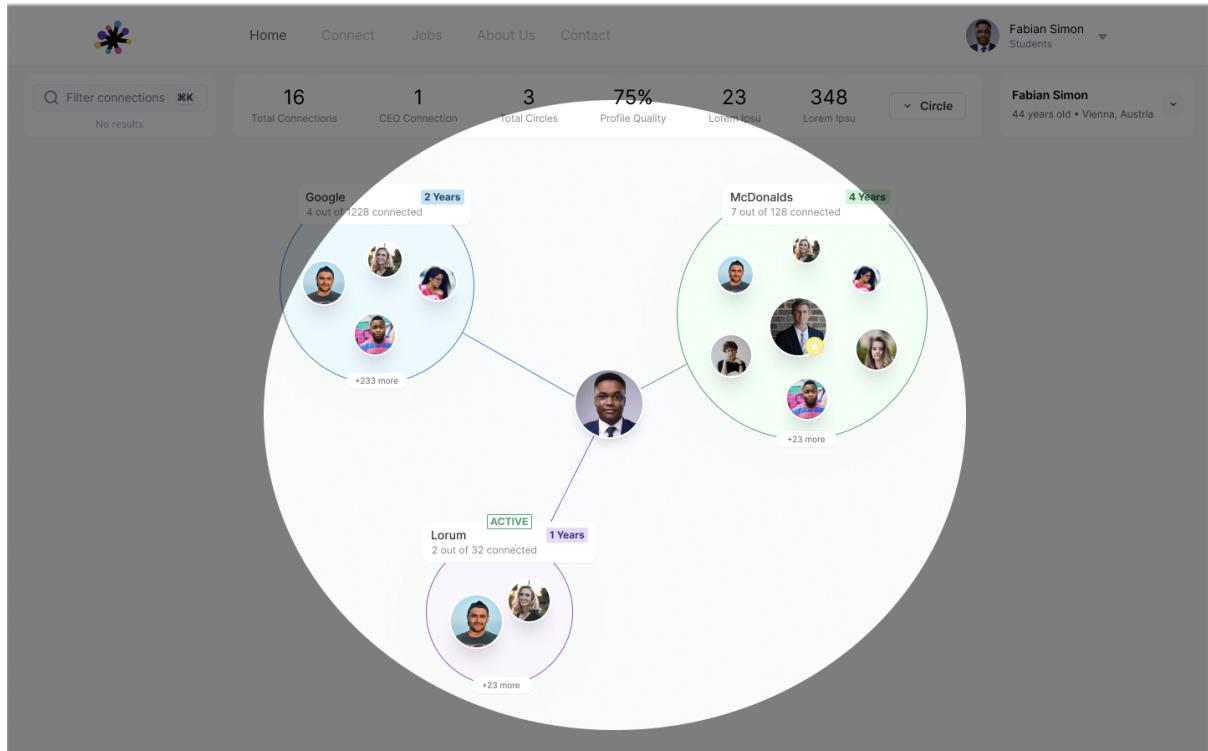
Using our advanced algorithms and revolutionary blockchain implementation you can expand your network like crazy\*\*

\*According to statistics provided by linked on

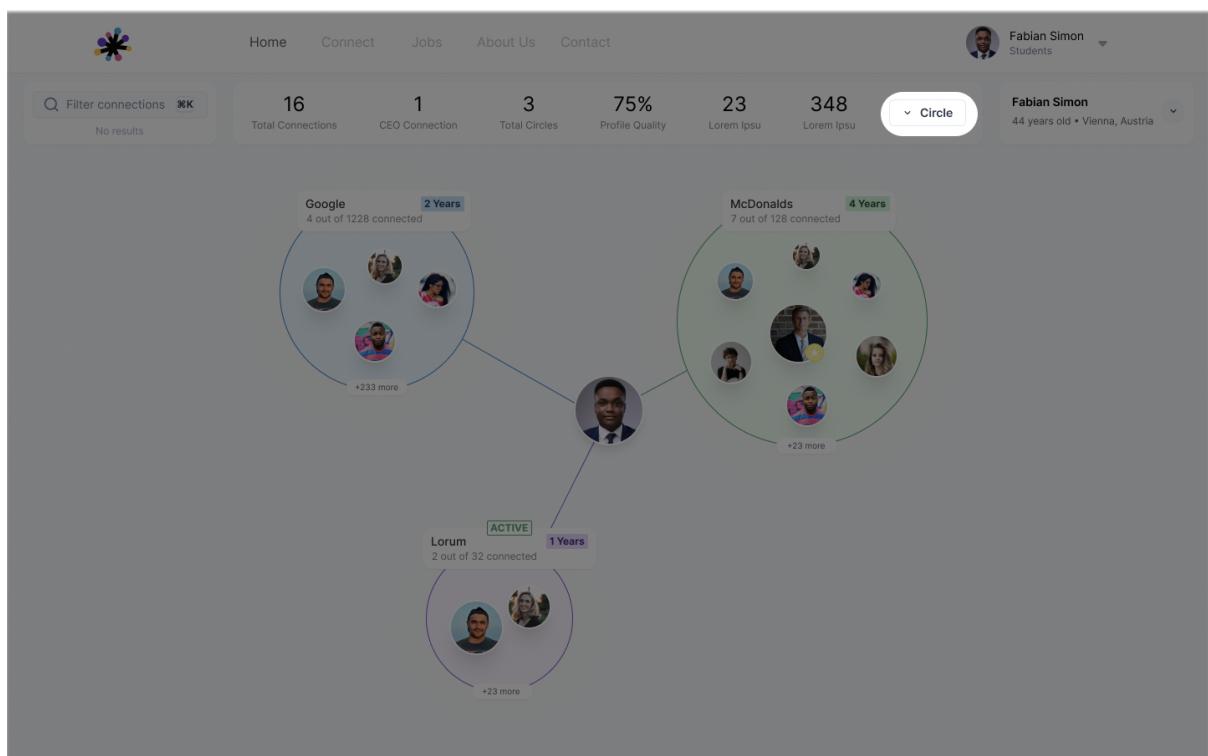
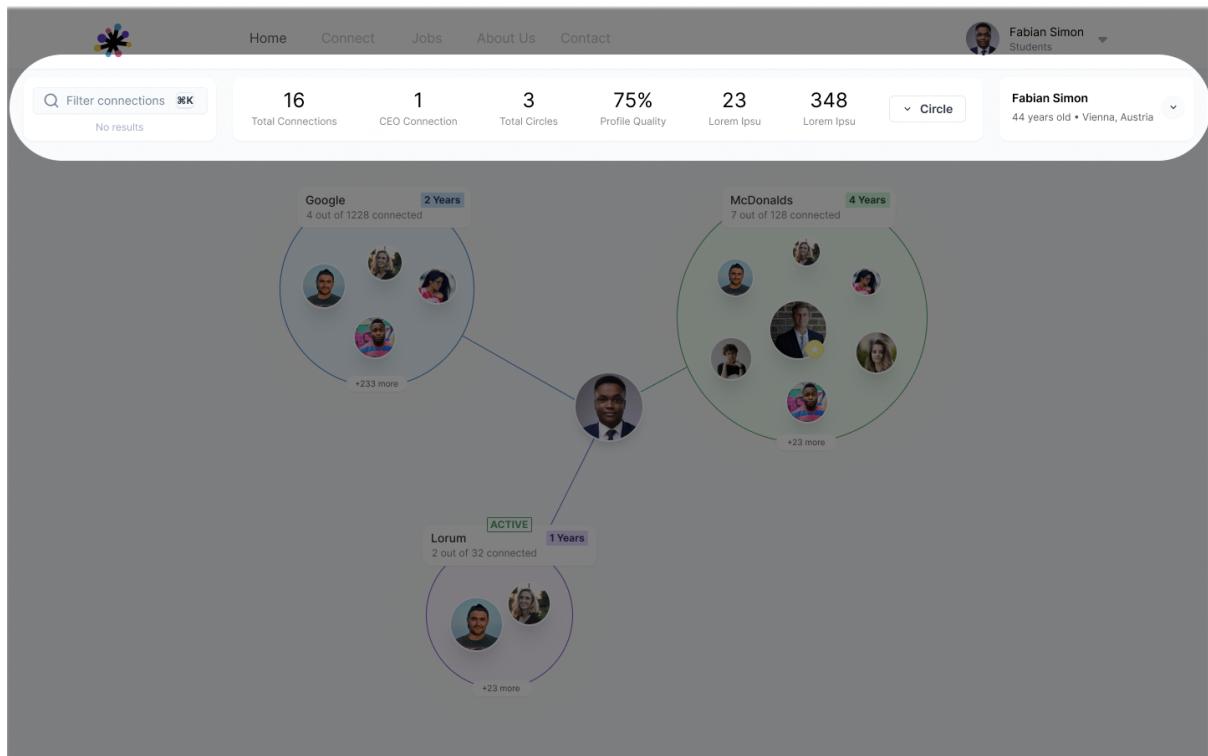
\*\*According to our completely biased opinion

## Graph Page:

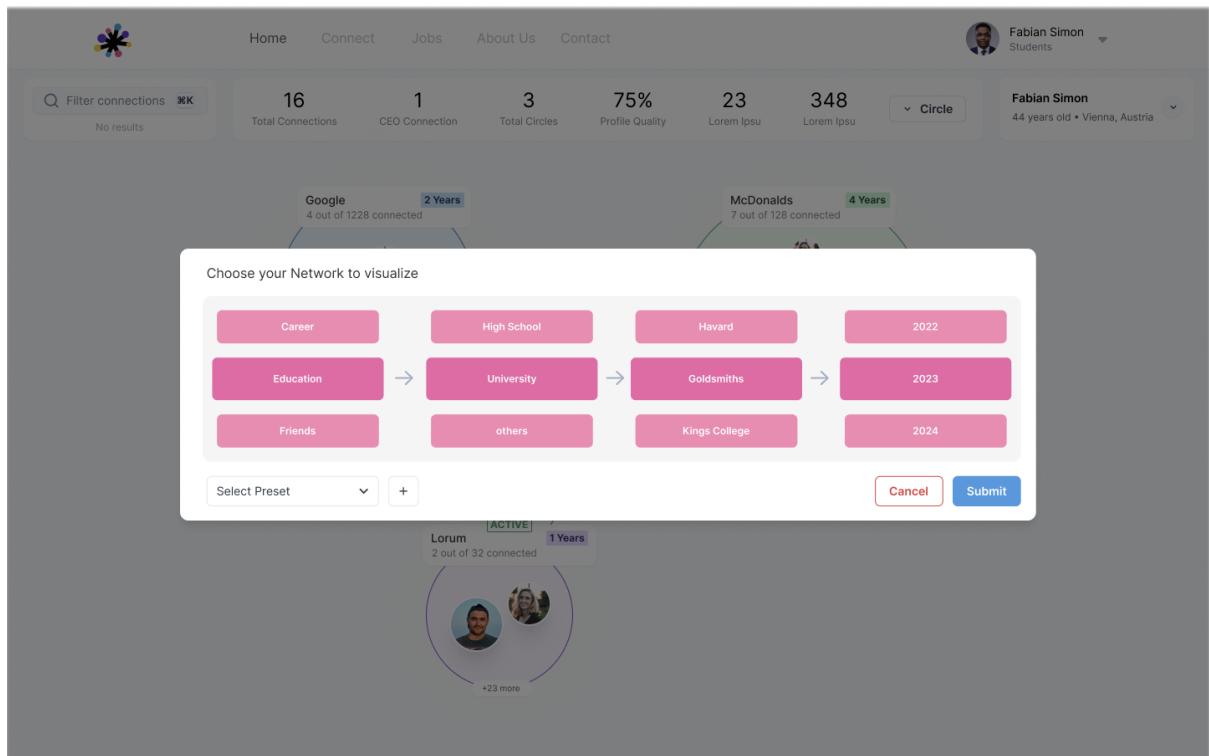
4. After being authenticated, you automatically will be redirected to our main page - the **graph page**. There you will be greeted with some mock data to check out how the whole website works



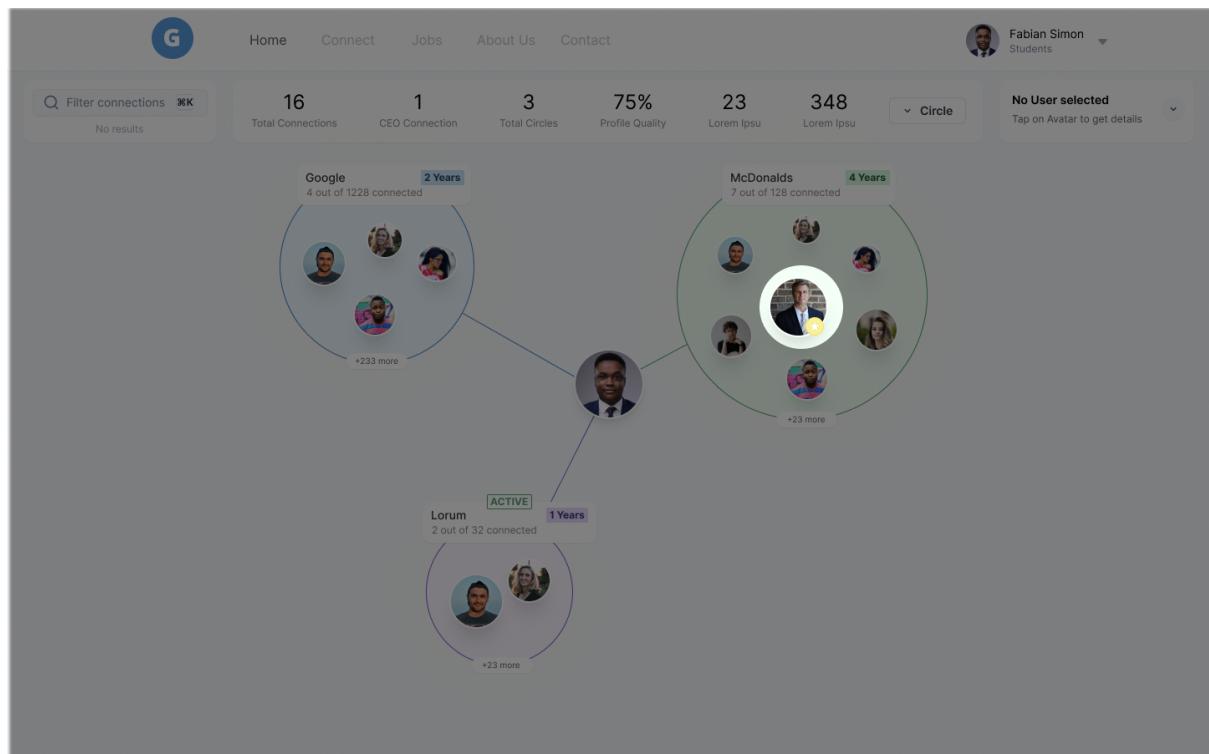
5. Here we will give you several options. **Search/Filter** functionality. **Total Stats** of your current connections and an option to change **your Circle**.



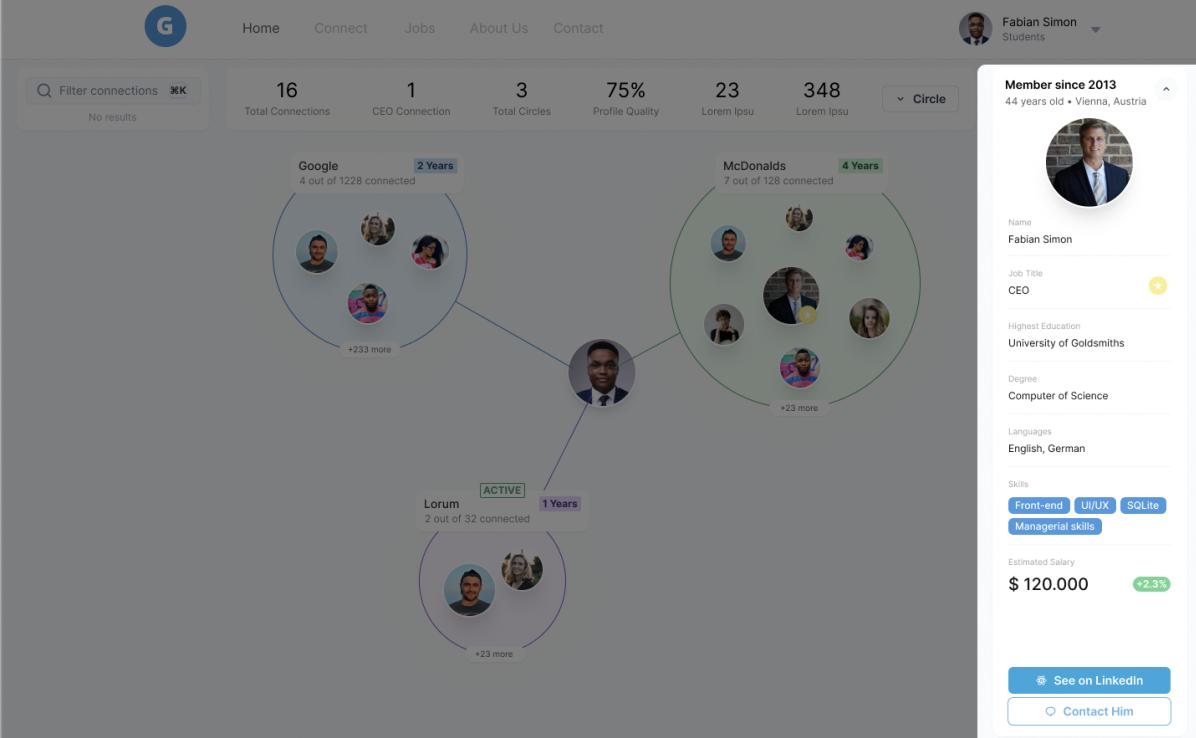
6. When clicked a **modal** opens. This way you can choose whatever **Circle** you are looking for. Furthermore, you can save or use your own custom **Presets**



7. After that your **Circle will be updated**. Now you can check out your current connections visually and most importantly, you can get some **insight** to each person in the graph by clicking on it

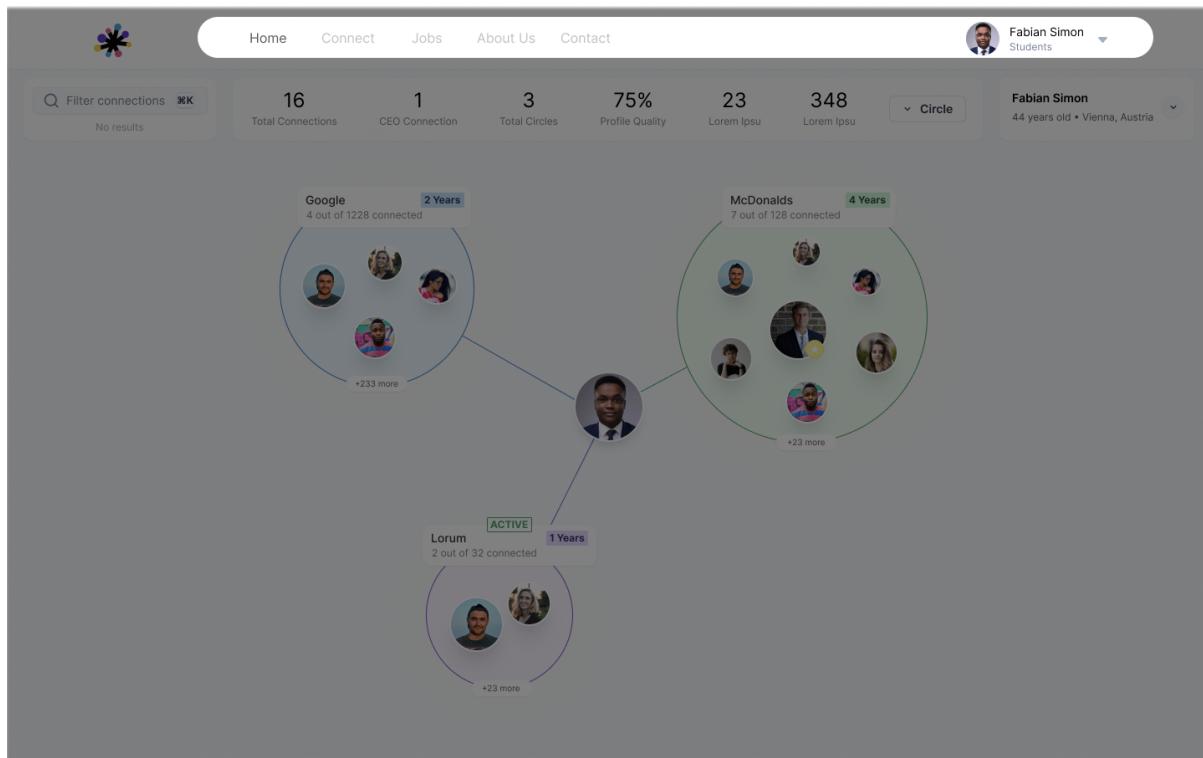


8. Here you will see several important details about that Connection. You will see his **position**, **salary**, **skills** and **much more**. Furthermore, you can click on one of the two buttons to check out his **profile on LinkedIn** or **contact him directly via email**



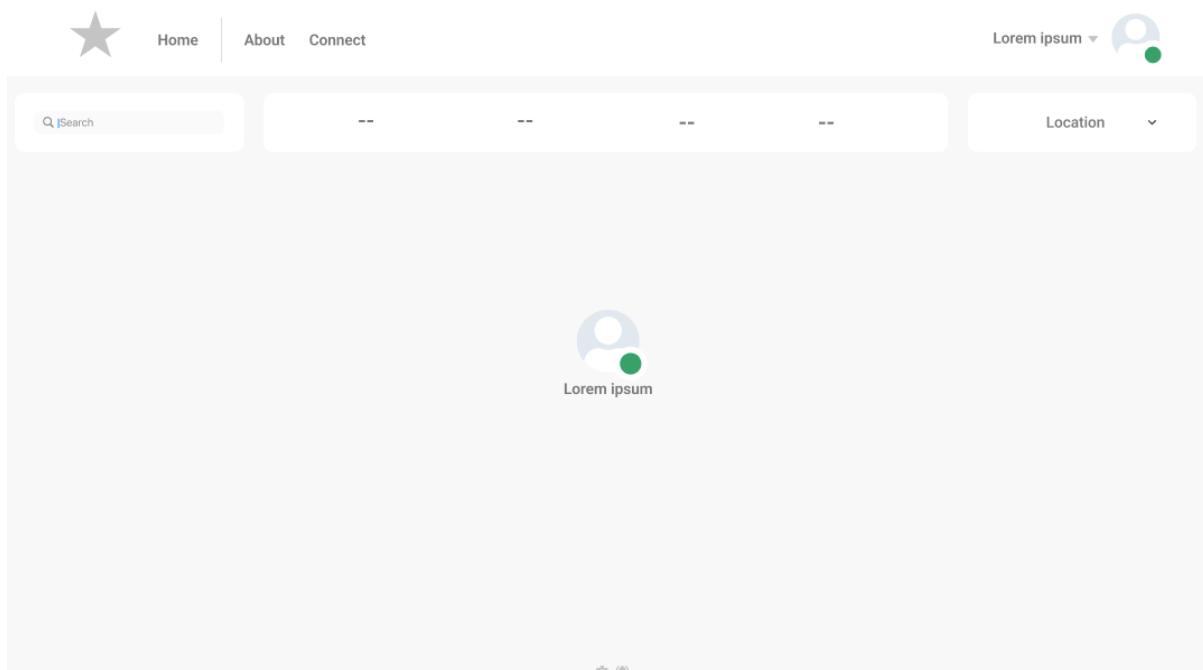
The screenshot shows a user profile for 'Fabian Simon' (Students). At the top, there are navigation links: Home, Connect, Jobs, About Us, Contact, and a user icon. Below the navigation, there are summary statistics: 16 Total Connections, 1 CEO Connection, 3 Total Circles, 75% Profile Quality, 23 Lorem Ipsum, and 348 Lorem Ipsum. A 'Circle' dropdown is open. The main area displays three connection circles: 'Google' (2 years, 4 out of 1228 connected), 'McDonalds' (4 years, 7 out of 128 connected), and 'Lorum' (ACTIVE, 1 year, 2 out of 32 connected). Each circle shows a list of connected users with a 'See more' link. To the right, the user's profile is detailed: Member since 2013 (44 years old, Vienna, Austria), Name (Fabian Simon), Job Title (CEO), Highest Education (University of Goldsmiths), Degree (Computer of Science), Languages (English, German), Skills (Front-end, UI/UX, SQLite, Managerial skills), and Estimated Salary (\$ 120.000, +2.3%). At the bottom, there are two buttons: 'See on LinkedIn' and 'Contact Him'.

9. Lastly, you will be able to selection additional options, to either **contact-us**, **about us**, **jobs**, **go to your profile** or to **be connected**.



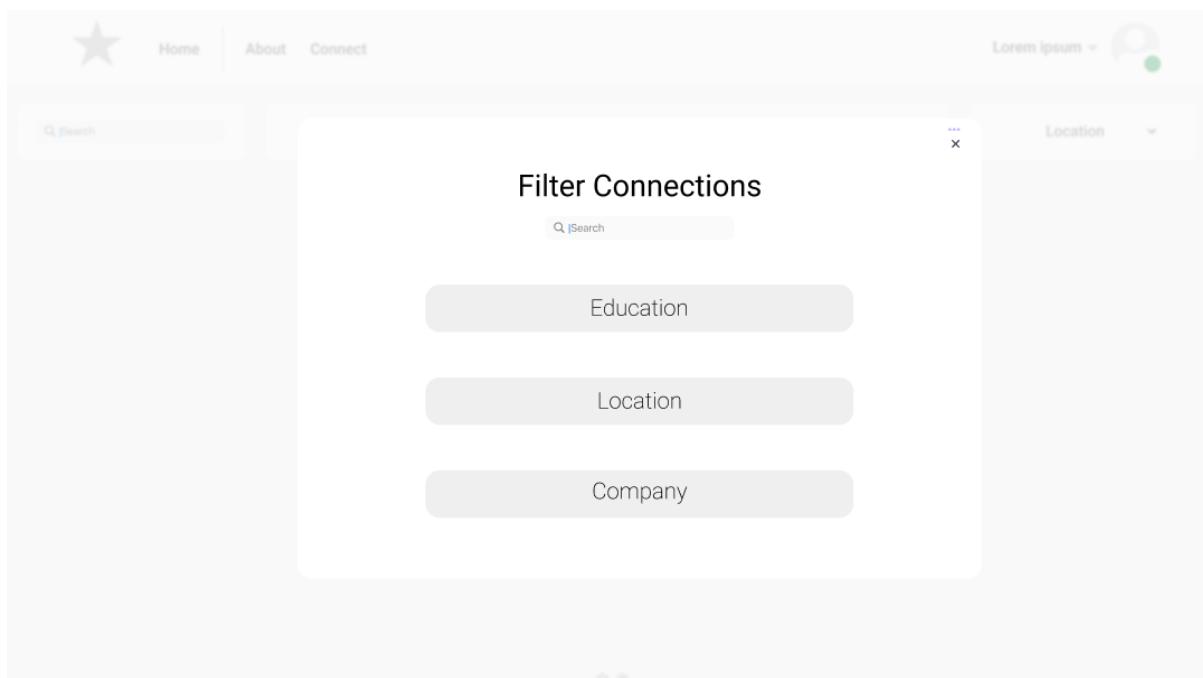
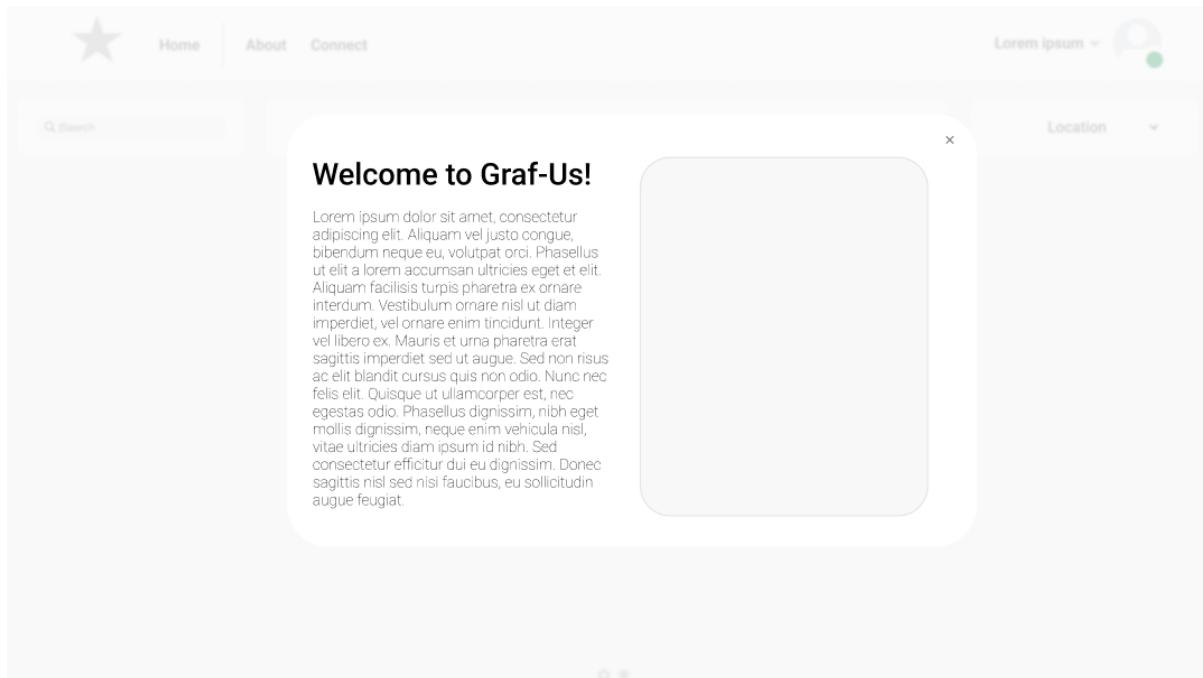
## Templates for each page

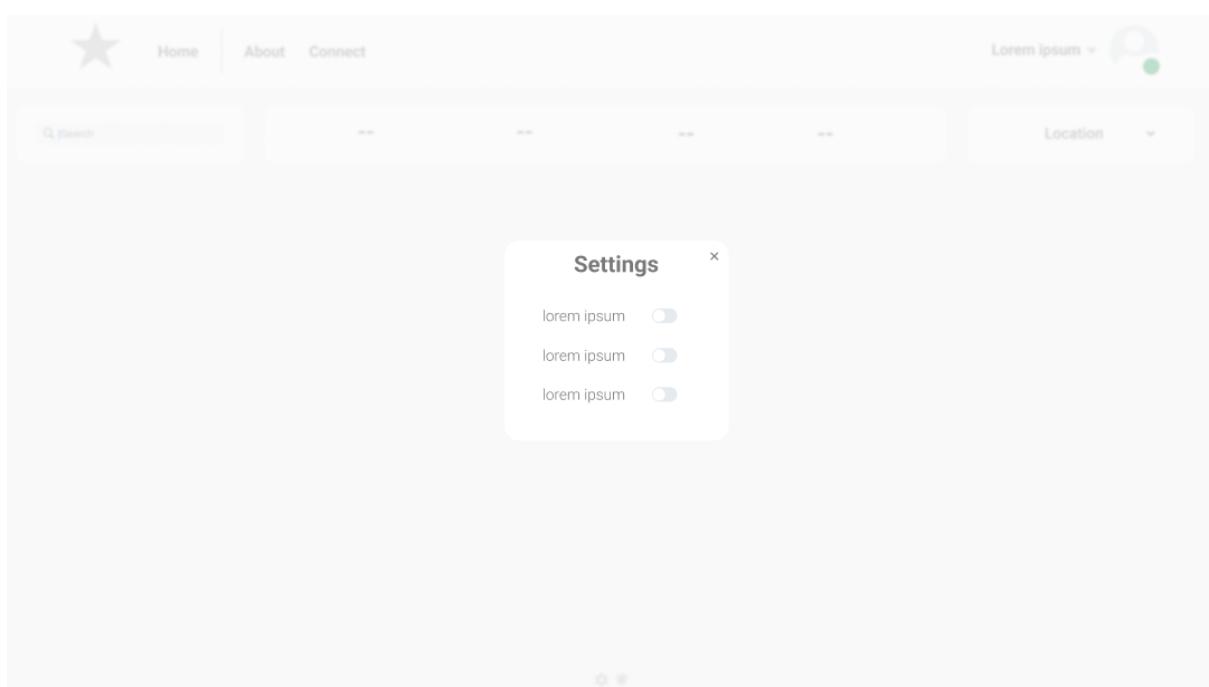
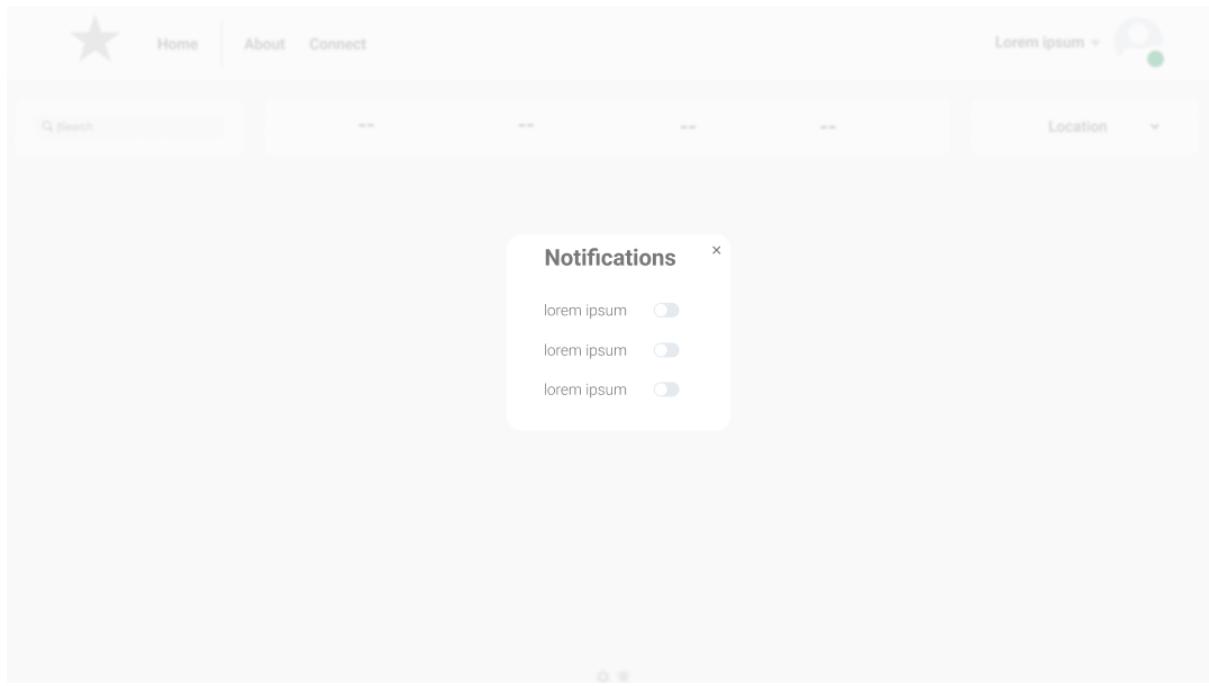
1. This template is an empty user profile page. We left a lot of open space which would be dedicated to forming our clusters and plotting them onto the page.



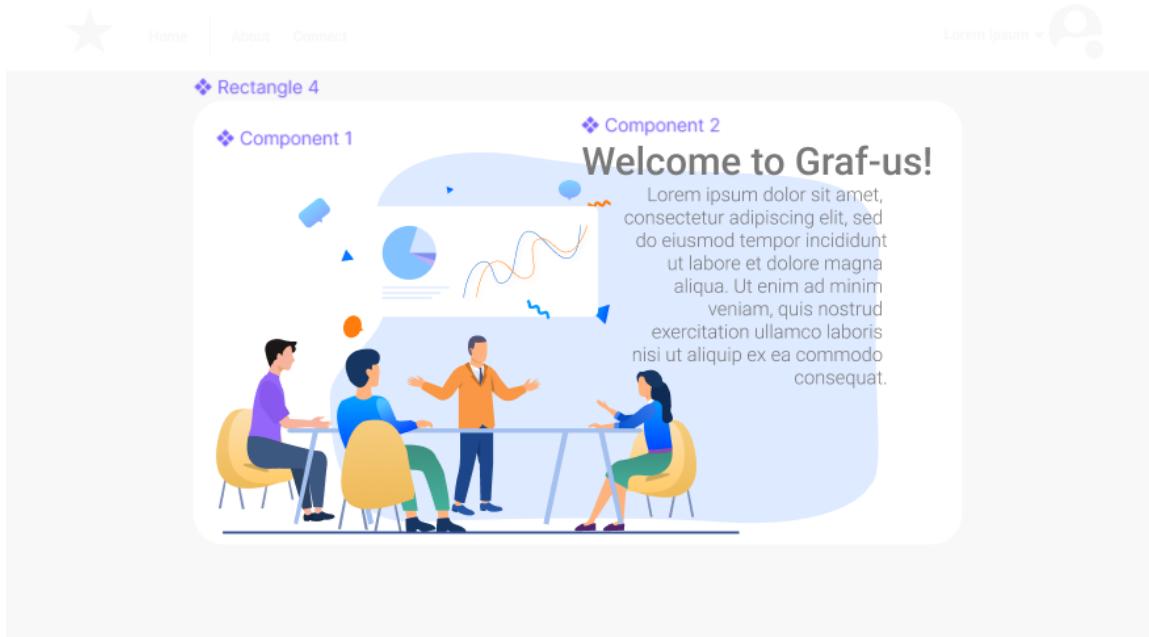
2. An About Us page that would pop up when it was selected from the navigation.

This design choice is in favour of the users so that they do not need to keep clicking between pages and waiting for load times. This design practice is common throughout our product, as it minimises space, saves user's time and makes it easier for the user to navigate the product. This can also be seen with the notifications, settings and filter connection pages.





3. This page is a welcome page that will appear after the user has logged into their linkedin account. It will provide a brief overview about the product they are about to use and it's features parallel animation in figma. To achieve this, we separated the illustration layer, the blue background, the text, and the white box to be its own component. Then, we linked each component to ease in one after another creating a smooth effect when users go on the site.



We compiled all of these pages to make a limited prototype and conducted some monitored user testing. The focus was on its functionality so that we could develop this product further with the front end team.

When conducting our user tests we make whoever is testing our product is familiar with what we're trying to achieve which is to provide a service for students/job seekers to allow them to visualise and strengthen their ability to network.

Collecting information to make informed decisions - helping companies identify new employees that would be more compatible within said company's culture.

We also asked them questions to gauge their affinity to already existing products within the market. Some questions included:

- How often do they use LinkedIn?
- Name and rank 5 people that you feel are integral to your career/education advancement.
- Ask how they currently solve any problems that our product also seeks to solve.
- Ask if they know of any product that is similar to this one.

### Participant 1

Name: Kushang Patel (he/him)

Age: 21

Education: Current First Year Undergraduate Student reading BA Criminology and Social Policy at the University of Nottingham

Occupation/Career Aspiration: Career Aspirations to work in the Legal sector, currently seeking an internship at a law firm.

- Currently not a LinkedIn user, circumnavigates this issue by attending career fairs and talks and networking in person. Is in contact with industry professionals through email.
- Couldn't think of a product or service that is similar to the one we are making.
- Top people in their network:
  - Recruiters at Clifford Chance, Allen & Overy, and LinkLaters
  - Solicitors at Clifford Chance and LinkLaters
  - Academic Advisors
  - Other fellow students that are also applying for law internships

### Participant 2

Name: Reanne Harris (she/her)

Age: 22

Education: Current Third (Final) Year Undergraduate Student reading BA Fashion and Textile Design at De Montfort University

Occupation/Career Aspirations: Furthering their education by pursuing a masters at Central Saint Martins

- Familiar with LinkedIn, but is not active on the platform.
- Connected to other classmates on LinkedIn, finds it difficult to connect with industry professionals as they aren't frequent users of LinkedIn
- Is familiar with other career services - Dots, but is aware they don't do the same thing this product does.
- Top people in their network
  - Professors that currently work in the fashion industry
  - Other students on the same course/similar courses looking to work in fashion
  - Working professionals within other fields of design

### Participant 3

Name: Farhan Mahmood (he/him)

Age: 21

Education: Undergraduate Degree in BSc Computer Science at University College London '21

Occupation: Software Engineer at BullionVault

- An active user on LinkedIn able to secure internships from companies such as Amazon, Lloyds and part time work from start ups.
- In contact with working professionals, who've been able to direct them to higher ups.
- Couldn't think of a product or service that does anything similar to this one.
- Top people in their network:
  - Current Employers at BullionVault
  - Former Employers from previous internships and start up
  - Recruiters within Tech
  - Other members from the graduating class

In terms of testing, the aim is to collect data that explains why users make certain choices while navigating the assigned tasks. Each task was monitored and users were encouraged to guide us in their process.

These questions were used to illuminate why users made the choices that they did:

- Which of these approaches/options do you find best and why?
  - By asking about specific aspects of the page (icons, menus, text), you will gather opinions on the design and functionality of the site and rework the confusing components.
- I noticed you [did something]. Why?
  - Follow up on any interesting behaviour observed during the test to get an insight of the thought process behind the user's actions. (For testing front and back end)
- What prevents you from completing a task?
  - Helps us identify the roadblocks that users face while interacting with your product. Could be simple (e.g. lack of information), or more complex (e.g.

dead end pages).

- How did you find the experience of using the website to complete this task?
  - Ask at the end when all of the tasks are completed.
- What did you think of the layout of the content?

Post testing we gather feedback about their impressions and opinions of your website and get a feel for the overall user experience. Final chance to ask the user questions that haven't been covered elsewhere before it's then sent to be developed further by the front end team.

- Overall impression of the product (so far).
  - Solicit feedback on the user's general opinion of your product.
- What do you expect to see in future iterations of our product in the future?
  - When multiple test participants name the same feature that they want to see in the future, this is a clear signal that you will need to prioritise your backlog.
- Best/worst thing about the product
- How would you compare this product to [competitor]?
  - Opportunity to see how different details of your website stack up against your competitors in the eyes of users.

#### Participant 1: (KP First Year Criminology and Social Policy Student)

- Would prefer if the icon had rollover text. Feels the icons are in a good place, however they appear too small on the screen.
- Arrows pointing down indicated a drop down menu, but led to pop up pages. Design will be reworked
- Functionality is mostly good, issues with drop down menus
- Layout is good; leaves plenty of room to view the network once implemented
  - Roadblock - user testing empty user page as graphing hasn't been implemented yet.
- The user believes this is a good jumping off point for the developers. Would like the menu systems to be reworked, but is overall satisfied with the basic functionality of the product.

- Would have liked to see how mapping the network would look like on screen, especially how an 'important' connection could be implemented in the product.
- Overall design layout was good: good use of the gridding system, legible text. Need to fix some of the boxes on the pop up menu as they appear larger and off centre.

Participant 2: (RH Third Year Fashion and Textiles Student)

- Functionality is fine, issues with drop down menus linking to a different screen. Other pages connected well.
- Drop down arrows pointing down but a pop up screen appears is confusing. Would prefer it to be linked to whole pages.
- Icons could be slightly bigger, but in a good spot.
- Search bar that's already in the selection menu (filter connections) should be removed, which feels unnecessary.
- Layout is good; sub menu systems need to be reworked, but is overall satisfied with the basic functionality of the product.

Participant 3: (FM UCL Computer Science Graduate '21)

- Generally the product is fine, but some aspects are implemented awkwardly. Arrows indicating a drop down menu leading to pop up menu systems.
- Would prefer it for the icons on the screen to be linked to whole pages, as opposed to popup menus
- Search bar that's already in the selection menu (filter connections) feels unnecessary, also noticed there's no option to confirm selection choice.
- Overall design is good, however, sub menu systems need to be reworked. Good use of the gridding system, likes the idea of the menu being in contained boxes so there's more room to display the network. Satisfied with the basic functionality of the product.
- Would have liked to see how mapping the network would look like on screen
  - User suggested D3.js for visualising data in web browsers.

## Why did we transition to/from PostgreSQL

We originally thought of using mongoDB, because of its document based approach. PostgreSQL is very efficient, can retrieve large information (such as

counting how many rows of data there are in a table under certain conditions), which is the reason why we chose to proceed with PostgreSQL instead.

SQLite is the current environment we are using to test connection to the database to get and retrieve data.

## **Justification to the transition between Mongo DB to PostSQL**

Data access performance of PostSQL is faster than the MongoDB in Django framework and also PostSQL is easy to implement in Django because of Popularity and Variety of PostSQL libraries.

Following the differences describe the why PostSQL is better than MongoDB:

### **MongoDB**

Risk of inconsistent information due to high amount of flexibility and therefore very scalable

For some operations, it is faster

Document based Collections

MongoDB uses methods to get collections and interact with the database

<https://www.mongodb.com/compare/mongodb-postgresql>

### **PostgreSQL**

It has more consistency

Complex transactions are supported (e.g., nested SELECT statements)

PostgreSQL is significantly faster when requesting large amounts of data, which we will need as part of our system to make quick calculations of how many connections someone has, which could be in the hundreds or thousands. As an improvement to this process, these numbers could be cached for easy and quick retrieval while not loading the server with requests.

Transaction performance with PostgreSQL is best with 128 concurrent threads.

Transactions per second surpasses 25000, whereas MongoDB only reaches 1786.

Source: [https://info.enterprisedb.com/rs/069-ALB-339/images/PostgreSQL\\_MongoDB\\_Benchmark-WhitepaperFinal.pdf](https://info.enterprisedb.com/rs/069-ALB-339/images/PostgreSQL_MongoDB_Benchmark-WhitepaperFinal.pdf) Page 17

PostgreSQL uses Structured Query Language (SQL), which is more common and has a vast amount of information as well as a big community.

In the following image we can see the columns that belong to the Users table and their respective queries to retrieve all records.

Users	
PK	Email_Id
	Name
	Age
	DOB
	Gender
	Password
	Contact_no
	City
	State
	Country

MongoDB  
db.Users.find({})

PostgreSQL  
SELECT \* FROM Users;

## Choses for the sever we chose

school server:

We are going to set graf\_us in the goldsmiths servers as they offer PostgreSQL without an additional cost.

DreamHost:

We have decided not to use PostgreSQL for our server hosted at DreamHost. The reason being that it has an additional cost. Therefore, we are temporarily using SQLite for testing purposes - this is not a reliable database, neither it is secure, but it is a testing tool. The url is: <https://graf-us.co.uk>

## Community detection algorithms reading

**Medium article :**

Context for why we used a medium article : Our research was extremely broad when looking into the field of SNA and was too focused on the sociology elements of the field.

After having a talk with Dr Lahcen Ouarbya he suggested that we focus on community detection algorithms for our work.

To act as an introduction for which algorithms we should look at we looked at an article written by Thamindu Dilshan Jayawickrama. Within the article he discusses multiple methods and why they are used.

Some of the more commonly used algorithms for SNA are also introduced.

These algorithms are the :

- Louvain Community Detection
- Surprise Community Detection
- Leiden Community Detection
- Walktrap Community Detection

We decided to use the Louvain algorithm because it is one of the more popularly used algorithms within SNA. As a result we have been able to find a wider range of support online in regards to applying the Louvain algorithm. Because it is easier to find support for the Louvain algorithm it will be the algorithm we will begin with.

## **General reading on social network analysis**

### **Paper 1 exploration :**

L. Vezzali and Dora Capozza " Improving intergroup relations with extended and vicarious forms of indirect" [5]

Context for the paper : In this paper SNA is used to map out connections in order to see how connections are made and how to improve relations between intergroup connections to the intragroup connections.

To encourage the flow of information between groups you can increase the diversity between cross group connections.

This can be identified by looking at the diversity of the ego network of an individual. If the individual has low diversity in their connections they are less likely to make new connections to others.

Increasing network diversity increase the direct cross group connections dependent on the diversity of an ego network

Identify those who are part of an in group : have lots of relations with those who have similar attributes. This is a hard topic because the variables are hard to define because of the lack of studies done into this topic.

Key note : extended contact had been mainly correlational vicarious contact has been experimental (**pre-experimental, quasi-experimental, and true experimental research**)



The major difference between correlational research and experimental research is **methodology**. In correlational research, the researcher looks for a statistical pattern linking 2 naturally-occurring variables while in experimental research, the researcher introduces a catalyst and monitors its effects on the variables.

---

Identify those who have a diversity of relations between in-groups and outer groups.

These people will be able to lead in vicarious between those in the in group and those in the out group

Someone who is too prominent in the in-group can cause negative feeling for some in the group. improving attitudes is needed first

Show less prominent nodes with connections to the out-group to encourage relations.

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## Week 3 report

### Project manager comments :

hypothetical team work velocity

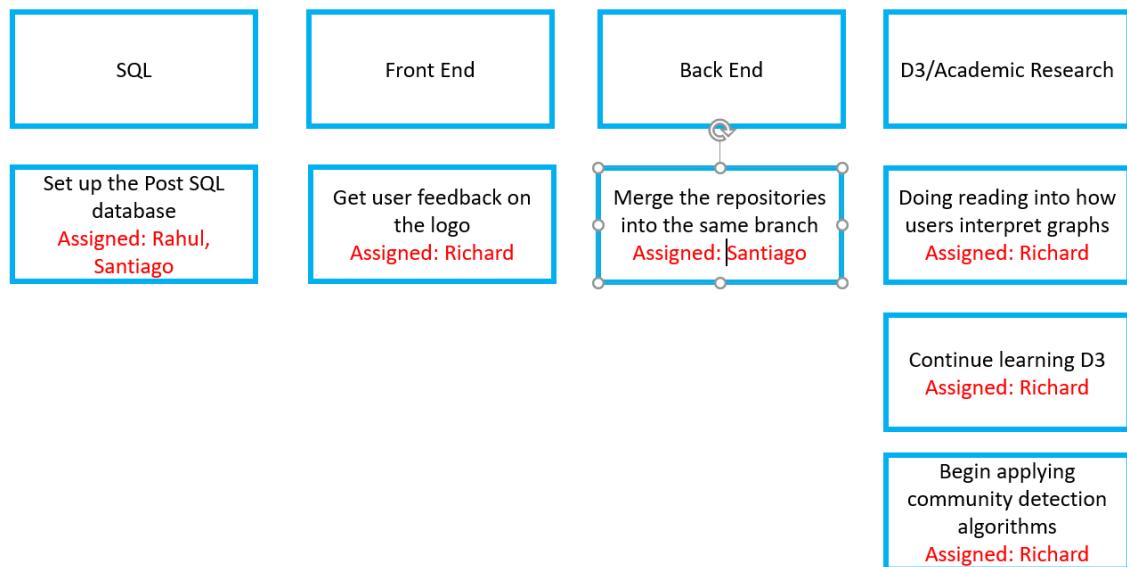
### Review of team work collaboration :

Team work enthusiasm for the project is still good however as the term continues the work load from other university work begins affect the amount of commitment each team member can make. In addition to this multiple team members have jobs outside of university which is also affecting the time commitments each team member can make towards the project.

## Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Doing reading into how users interpret graph	To do reading into papers to see what research has been done	This is to get a starting point for our design	To have a brief understand of the established research	
Get user feedback on the logo	Conduct Participatory design study	To have user centered design	To have feedback	
Set up the Post Sql database	Set up using node js module to install post sql for backend development	To have a data base system	To have a database system	
Merge the repositories to the same branch	To select the valid branches	We have created too many branches which has made it difficult to keep track of development	To have a more organized repository on Git hub	
Continue to learn D3	Try to understand nodes and links in d3.	To represent the force directed graph using d3.	Successfully Implement the Force directed graph using d3.	,
Continue learning and begin apply community detection algorithms	To apply the Louvain to a data set and continue to do reading around the subject	To be able to identify communities to then go onto identify key individuals in communities	To have detected communities in test data sets	

## Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Doing reading into how users interpret graph	3	We have done reading into the subject but our understanding of the reading is limited. More reading around the subject needs to be done	Do more reading around the subject
Get user feedback on the logo	5	We have feedback on the logo	Use the feedback for the design principles for the website going forward
Set up the Post Sql database	4	Most of the back end is set up but still needs to be integrated with other parts of the system	To continue with integration
Merge the repositories to the same branch	5	This Git Hub repository is more organised now	Keep the repository organised
Continue to learn D3	2	Some progress has been made in learning D3 but progress is slow	Continue learning D3

## Participatory design: **TO DO**

### **Justification :**

Because our product is based around creating visualisations for the user we decided to use participatory design to put the user at the centre of the design aesthetic for Graf Us. By involving our users in participatory design we are making them active stakeholders which should allow us to shift the design to be more approachable to user.

### **How to make it neutral**

To keep the experiment controlled and to not draw too much focus to our logo when getting feedback we added two other neutral images with a similar color palette. In addition to this between each showing them a logo we showed them a mood board of neutral images for two minutes to avoid them from focussing too much on one logo.

### **Opportunistic questionnaire**

Questions that were asked for each logo :

What emotions and thoughts do you have when you see this logo ?

Possible prompts :

Could you explain why you feel that emotion in more detail ?

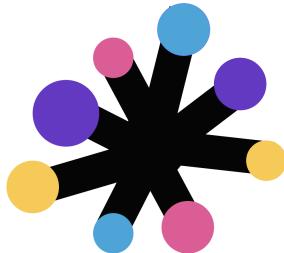
Why did that thought come to mind ?

Logos that were shown,

logo 1



logo 2



logo 3



<https://medium.com/@SimaoLagoa/how-to-ask-for-feedback-on-logos-and-other-design-items-2af9bc5d8f86>

**Question asked : What emotions and thoughts comes to mind when you see this logo?**

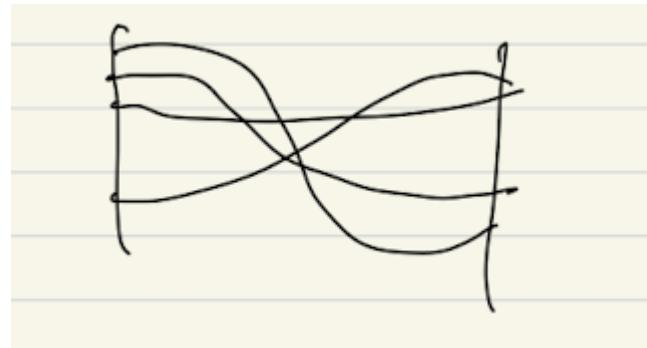
Getting feedback on the logo

RM (Third Year PPE Student):

- Logo 1) Looks like a toy "bit weird" look like it's for kids no emotion
- Logo 2) Look like its science related, no emotion reminds them of atoms in science. Like a science model.
- Logo 3) Evokes a happy emotion, "more open"

**Participatory Design - What visual image do you imagine when you hear the word connection?**

Wire connections; wires connecting to different things. wires connection things together.



Computers connecting around the world. wires connecting like the lost one.



ES (Third Year Psychology Student):

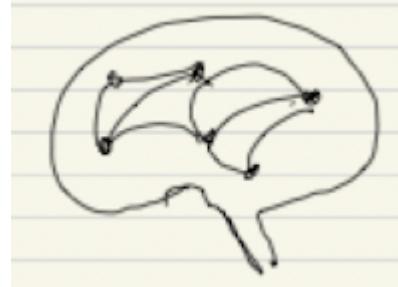
- Logo 1) Feels safe and homely. Comfortable because it's looks like a home.
- Logo 2) Looks creative looks modern feels like is is tech related. Colours provoke the feeling that it's new. (looks like a cartoon)
- Logo 3) Positive, simplistic, looks colourful, symmetry cause it's familiar. looks tech related because of shapes.

**Participatory Design - What visual image do you imagine when you hear the word connection?**

Hands holding, connecting to wifi, conversation, going online



Social Media, different networks they said: "idea seems fuzzy don't know what i imagine" Idea wasn't clearly defined in their mind.



OJ (Third Year Law Student)

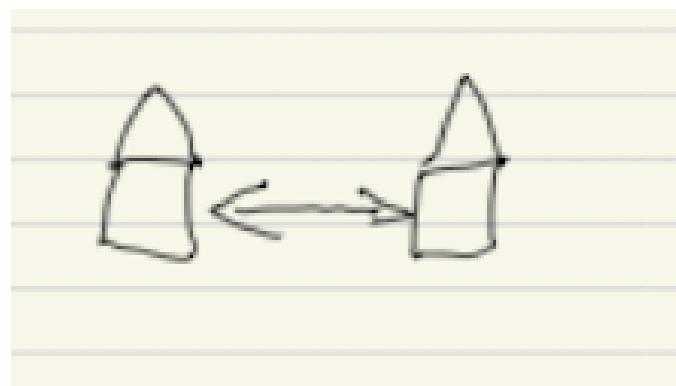
Logo 1) Happiness, comfort, feels like i'm at home playing a game in 2012, likes the use of soft colours

Logo 2) Makes me feel stressed, feels like work and organising. Reminds them of mind maps

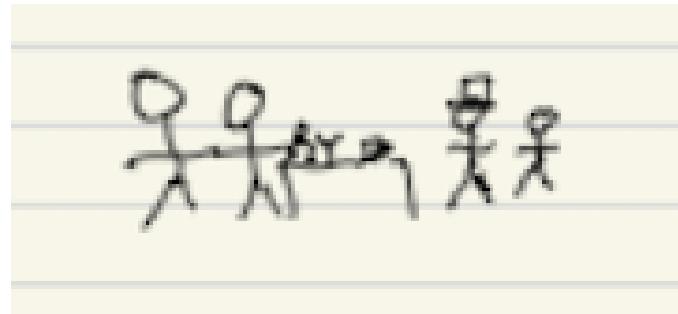
Logo 3) Confusing due to the overlapping colours, can't tell if the box is up or down

**Participatory Design - What visual image do you imagine when you hear the word connection?**

Thinks of arrows, envelopes, wifi symbol



A fishing net



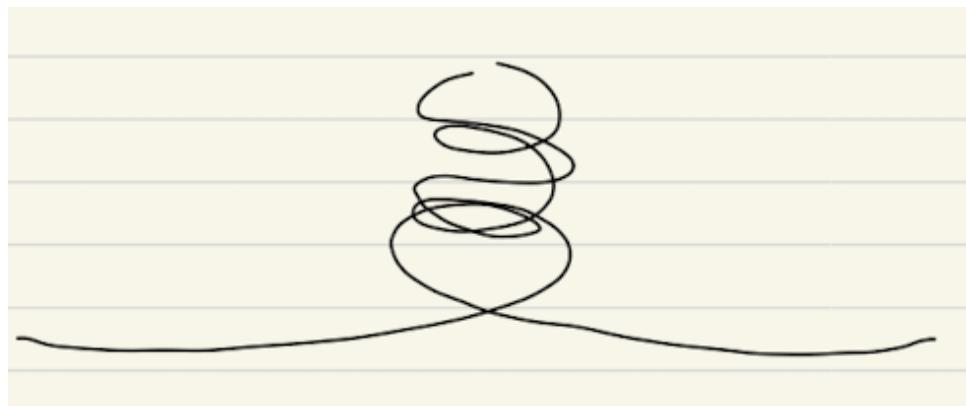
HK (Third Year Law Student)

Logo 1) looks like a home

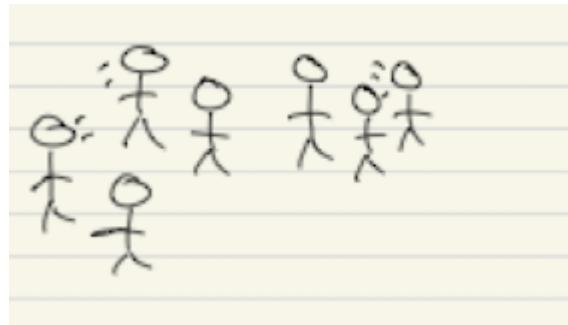
Logo 2) logo looks like a virus

Logo 3) very pleasing messes with the eyes likes symmetry

**Participatory Design - What visual image do you imagine when you hear the word connection?**



Two strings/lines connecting



Lots of people chatting

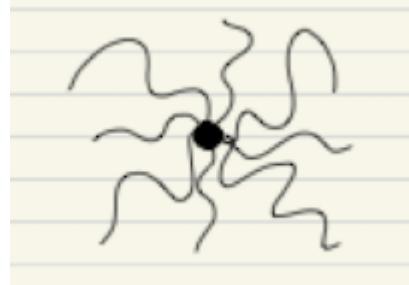
LBC (Third Year PPE Student)

Logo 1) Safe looks like home, likes the colours

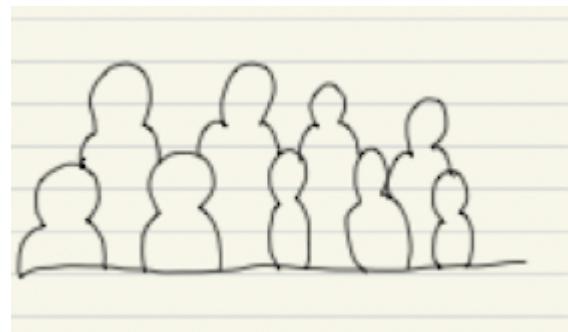
Logo 2) Erratic (mentioned different lengths and sizes) , looks fun (annoyed colours are not the same opposite each other), looks like science

Logo 3) Likes the symmetry, likes the overlap and the different dimensions, looks 3d, compared the other ones that looks flat.

**Participatory Design - What visual image do you imagine when you hear the word connection?**



Something that is fluid, not particularly angular (not geometric)



People socialising, joining in on things. Big room of people.

## **Evaluation of participatory testing :**

### **Setting up the PostgreSQL data base:**

What was the process ?

PostgreSQL was downloaded in our local machines through "homebrew", a tool that allows easy downloads of applications such as this database.

After running the command "brew services start postgresql", the default port is 5432. This information along with "localhost" is necessary to connect through "pgadmin", or "tableplus" both are GUIs for PostgreSQL.

### **Merging the Github repositories**

what was the issue that we have:

Project started with Reactjs, later we needed to implement the Django framework.

why did we merge them:

Because we need the front end to connect to the back end which then connects to the database and sends/retrieves data

which branch did we choose and why:

In terms of branches, we used "Version-0" as just a branch for the first Reactjs project, as its name suggests, it is a version that came before the backend was implemented.

"Version-1" is our current default branch and where we put all our developments so far, representing the final version of our project. "Version-{x}" is what we are planning to name our next branches for future versions.

"Alpha" is the branch that we are using to test our work before putting it in "Version-1".

---

## **Week 4 report**

## Project manager comments :

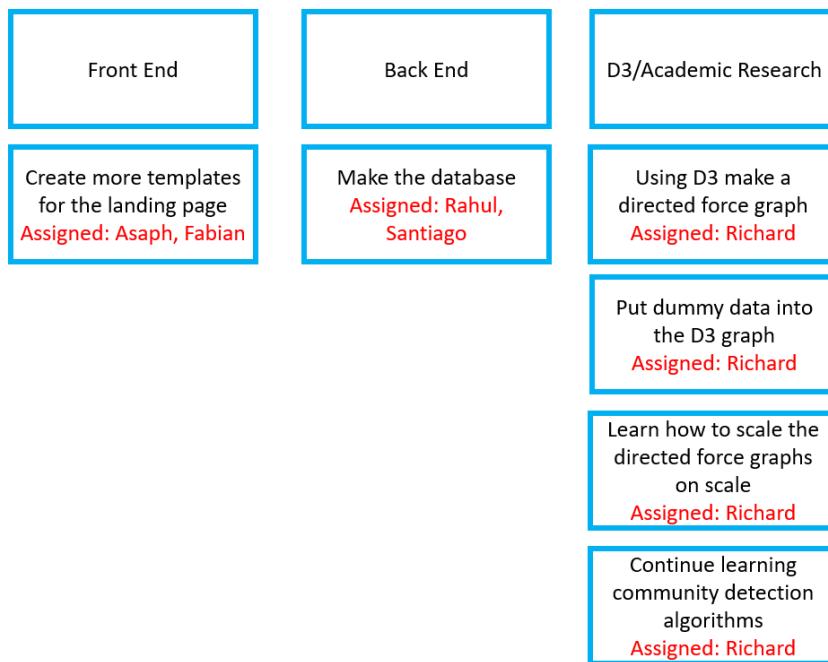
issues with team work velocity, external commitments make it hard be consistent enough to measure

## Review of team work collaboration :

### Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Using D3 make a directed force graph	To learn and begin how to use a more specific library to create graphs	This library is interactive and can display the graphs we need	To have a working D3 graph model	
Learn how to scale the directed force graphs on scale	To create a JS object that can be passed into the D3 graph library	To be able to pass in Json data easier at a later point	To be able to make graphs when passing in our object.	
Make the database	Making the database models in Django Project and Migrate into Database.	To Create successful database structure.	The Database created successfully and the relation between different tables are connected.	
Continue learning community detection algorithms	To continue to read papers around the subject	To have a better understanding on how SNA works	To have additional notes on SNA	

## Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Using D3 make a directed force graph	2	Progress is slow	Continue with development
Learn how to scale the directed force graphs on scale	1	There is a lot of trouble being able to structure everything correctly	Continue with development
Continue learning community detection algorithms	3	There is continued learning about the subject but there is also confusion about how everything works	Continue with development

## Creating more templates for the landing page

### Making the database

what did we do to make the database:

Django automatically generates SQL queries to be executed on the database by the use of classes in the “models.py” file.

```
1  from django.db import models
2
3
4  # https://docs.djangoproject.com/en/4.0/topics/db/examples/
5  class User(models.Model):
6      email = models.EmailField(unique=True, blank=False, default=None)
7      password = models.CharField(max_length=256, blank=False, default=None)
8      first_name = models.CharField(max_length=50)
9      last_name = models.CharField(max_length=50)
10     date_of_birth = models.DateTimeField(null=True)
11     gender = models.CharField(max_length=1, null=True)
12     country = models.CharField(max_length=50, null=True)
13     state = models.CharField(max_length=50, null=True)
14     city = models.CharField(max_length=50, null=True)
15     contact_number = models.CharField(max_length=20, null=True)
16     created_at = models.DateTimeField(auto_now_add=True)
17
18
19     # One to one Relationship with User
20     class Profile(models.Model):
21         id = models.AutoField(primary_key=True)
22         user = models.OneToOneField(
23             User,
24             on_delete=models.CASCADE
25         )
26         description = models.TextField()
27         college = models.CharField(max_length=255, null=True)
28         university = models.CharField(max_length=255, null=True)
29         current_company = models.CharField(max_length=255, null=True)
30         hobbies = models.TextField(null=True)
```

Above is a code snippet of two of the classes. As you can see on line 22 and 23, each profile has a One to One relationship with users. This means each user can only have one profile, and each profile can only belong to one user.

Below is code generated by Django, located in `Graf_us/api/migrations`:

```
1  # Generated by Django 4.0.1 on 2022-03-13 09:20
2
3  from django.db import migrations, models
4
5
6  class Migration(migrations.Migration):
7
8      initial = True
9
10     dependencies = [
11         ]
12
13     operations = [
14         migrations.CreateModel(
15             name='User',
16             fields=[
17                 ('id', models.BigAutoField(auto_created=True, primary_key=True, serialize=False, verbose_name='ID')),
18                 ('email', models.EmailField(default=None, max_length=254, unique=True)),
19                 ('password', models.CharField(default=None, max_length=256)),
20                 ('first_name', models.CharField(max_length=50)),
21                 ('last_name', models.CharField(max_length=50)),
22                 ('date_of_birth', models.DateTimeField(null=True)),
23                 ('gender', models.CharField(max_length=1, null=True)),
24                 ('country', models.CharField(max_length=50, null=True)),
25                 ('state', models.CharField(max_length=50, null=True)),
26                 ('city', models.CharField(max_length=50, null=True)),
27                 ('contact_number', models.CharField(max_length=20, null=True)),
28                 ('created_at', models.DateTimeField(auto_now_add=True)),
29             ]
30         )
31     ]
32
33
34
35
36
37
38
```

---

## Week 5 report : Reading week

### Project manager comments :

Issues with learning and distributing work equally

Keeping up team moral

### Data-structure for storing the connection information:

As user connections can be stored in the matrixes. as matrix can be design using the User Id and when user connects with other user which be set the matrix row and column value set to true which means connections is approved.

### Why Matrix is bad choice:

Arrays are used to represent the matrixes which is not good as its used space that are not usually all are utilised.

Property of arrays is that array elements are stored in continuous memory locations. Furthermore, arrays have a fixed size which is defined upon initialisation, So if more users are added then new matrix need to be created and copy all existing matrix data into newly created matrix.

### **Why Linked-List is good Choice:**

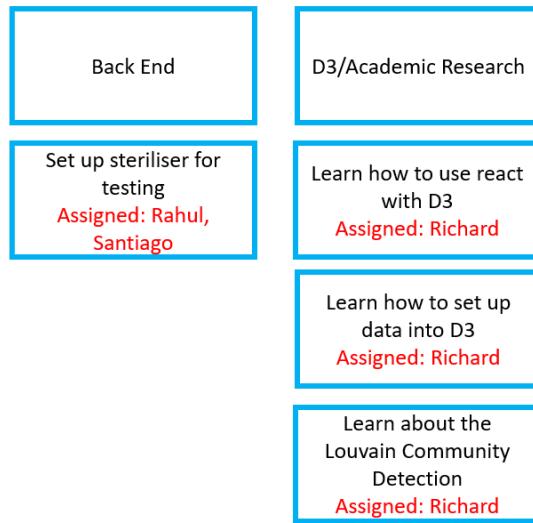
A linked list is another approach to collecting similar data. However, unlike an array, elements in a linked list are not in consecutive memory locations. A linked list is composed of nodes which are connected with each other using pointers.

### **Review of team work collaboration :**

#### **Goals :**

Goal	Approach	Reason	How to measure success	Assigned to
Learn how to use react with D3	To read online tutorials and documentation	To be able to link the diagrams we make with the front end	To have an integrated D3 graph with the front end	
Learn how to set up data to load into D3	Create a data structure that will allow data to be loaded into the D3 graphs	To be able to visualise the data	To have a basic visualisation	
Set up a serializer for testing	Created classes to test users functionality	To validate interaction with the system	Percentage of tests pass rate	
Learn how the Louvain Community Detection	To read chapter 6 in a first course in network science	To be able to use algorithms to detect communities	To be able to apply the Louvain algorithm to a given data set	

#### **Kanban :**



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Learn how to use react with D3	2	This is difficult. Progress and learning is slow	Continue with development
Set up a serializer for testing	4	Converting the Database table fields into respective serializer variable name. and Data can access properly.	Continue with development

## Reading into how people understand graphs :

Peter Chapman and Gem Stapleton "Introducing Second-Order Spider Diagrams for Defining Regular Languages" [6]

Context : This paper takes a look at how to use diagrammatic logic to define regular languages providing another mechanism we can understand standard languages. This paper is significant because before this paper, according to the paper itself, there have "there has been no attempt to develop a diagrammatic logic that is capable of defining non-star-free regular languages". This implies much of the work in this space is novel.

In the paper when exploring how to represent language in the form of spider diagrams much of their work was inspired of the work of Euler diagrams and the

diagrams he created for graphs.

With in the paper they explored how the different ways arrows can be drawn to communicate information which was based of Euler diagrams. For the arrows they used they used different styling to show a variety of connections.

In addition to this they used arrows to show to represent binary relations. This can be used to show directed relationships which can show the order of the relationship.

In the paper Social Network Analysis in the Science of Groups: Cross-Sectional and Longitudinal Applications for Studying Intra- and Intergroup Behaviour [2] that was explored in week 1 the binary relationships between connections is important to understanding being able to identify key patterns.

We can use the visualisation in this paper to represent the relations discussed in the paper discussed in week 1.

You cannot communicate any ordering of a sequence of actions.

This is an issue that has been discussed more broadly in the around graphs in SNA. The order of events that connections are made cannot be shown in the current use of graphs at the moment. This is problematic because when SNA is normally done on static connections at a given point however connections in real life exist dynamically were new connections are created and old connections end over time.

## Initial enterprise plan

The enterprise part of the project was lead by Richard to see if there was a real demand in the market for Garf Us and to see if it was possible to find funding to be able to pay for the tools that we need to be able to scale Graf Us.

Goal	Approach	Reason	How to measure success
To reach out to possible investor networks	To see what networks out there are willing to have a meeting with us	This is to be able to gain some feedback on our business approach and to measure appetite for Graf Us on the market	To see if the business model was valid
To have talks with the	Book a meeting with the enterprise	To get feedback from the university and to get engaged with the	To have received

## Enterprise notes :

### Initial business plan :

For our initial business plan we had two plans to generate revenue.

The first source of revenue could come from Graf Us providing consulting services. What inspired this was an SNA experiment conducted by Albert Barabasi in his book the Formula. [7]

In the book he discusses how the traditional way a company communicates information from the leadership team to others at the company.

The traditional way to communicate information at a given company is for someone on the leadership to communicate an idea to a senior manager. This senior manager would then pass this information onto line managers who would eventually pass this information to their teams.

For the company that he carried out his research he discovered that the traditional way of communicating information was inefficient.

Note : Greater reading around the subject would suggest that this method is inefficient because it relies on adjacent connections. When relying on adjacent connections the chains needed to communicate information become longer. To communicate information more efficiently having a larger amount of random connections is more ideal. This is because this allows for communication to spread with smaller chains. This idea is explored in detail within chaos theory.

Barabasi made the observation that the most ideal person to pass information to in order to communicate ideas was the safety manager. This is because the manager would spend his day walking around the company and would have random conversations with people throughout the company throughout the day. As a result he was the most ideal to pass information to over managers at the company.

The other source of revenue would come from creating a platform and following a similar revenue as Tinder. Tinder provides their service for free however you are limited in your daily use. To gain greater access you would need to pay for a premium account.

## Platform research

Reasoning for research : If we want to generate a similar revenue model as Tinder we need to understand how users interact with social platforms and understand the process that early start ups take when generating a platform.

### Case study we read : Bugs Bee case study notes

Features of the platform :

- Once registered, a user can be an organizer and invitee.  
A user can register using social media accounts such as Facebook, Twitter, and Google accounts.
- The profile can have a user's personal, professional details.
- The organizer can view the profile details of the invitee, chat online with them, and send them an invite for the event.
- The invitee can view the information of the event like venue, date, location, duration.  
The invitee can send friend requests to the organizer.
- Both users can have their favorites. There are dedicated "Favorite me" and "My favourites"

Issues they had : Searching and identifying matches



"Searching based on the matches between the hosts and the dates involving multiple parameters such as interests, just to name a few."

How this issue was addressed :

Finding what features people expected to get out the app

Tests that can be done for graf\_us



**"UAT:** User acceptance testing was conducted at multiple, but crucial stages, so that in case some disparities were creeping in, they could be nipped in the bud and the right course of action could be taken."

**"Integrating database:** The stability of the database was of prime importance because every valuable information would be derived from the database. We ensured through database integration with the interface of the mobile app."

## Initial pith deck :



**Graf\_us**

Slide 1 :

Welcome we are Graf US



### Why Graf\_us came to be

LinkedIn connection suggestions:

- Anna Sanger - 111  
Risk Consulting and Sector UK Intern | Coughlough University School of Business, Nottingham
- Christopher Martin - 14  
Police Detention - 1 is a mutual connection
- Emmanuel Obihundu - 14  
Software Development and Quality Assurance Software Engineer | Software Engineer, Quality Assurance, and 1 other shared connection
- Hannah Jarmulowich - 14  
Software Development and Quality Assurance Software Engineer | Software Development and Quality Assurance Software Engineer, and 1 other shared connection
- Cihan Dogan - 14  
Machine Learning Scientist Internship in Life Sciences and Technology | Machine Learning Internship in Life Sciences and Technology, and 1 other shared connection
- Asaad Khalid - 14  
Machine Learning Internship in Life Sciences and Technology | Machine Learning Internship in Life Sciences and Technology, and 1 other shared connection
- Joe Barnes - 14  
Co-ordinator, Academic Programs and Dean's Office at Age Quent University | Co-ordinator, Academic Programs and Dean's Office at Age Quent University, and 1 other shared connection

Slide 2 :

LinkedIn is commonly used to network with others however at times it can be difficult to know who to network with.

One way find people of importance is to see who we know and who shares certain connections.

However the only way to see all your connections is to click on the connections section where you can only see up to 7 connections at a time. Evenly more tediously to be able to see

which connections you share you have to click on each individual connection.

This is a very slow process to go through in order to explore your connections which bought a group of my friends and I to make Graf Us.

### Slide 3 :



#### Why Graf\_us came to be

Our theory :

People want to see the connections they have on their Linked In

After having broader discussions with both class mates and to people in industry who commonly use Linked In we came up with the theory that people want to see their connections.

#### How it works



sign in with your social media account → we load your connections → A visual representation of your connections is shown using graphs

### Slide 4 :

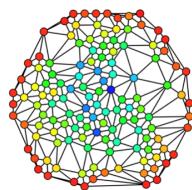
The way it will work is you can sign in with your social media account (beginning with Linked In). We can then load your data in and create a visual representation of your data with graphs

#### How it works



However looking at graphs can be complicated.

Using an emerging field called social network analysis (SNA) we will identify key connections in your network for you



### Slide 5 :

However interpreting graphs can be tricky, but using an emerging field called social network analysis we can help identify key information for you and allow you to select and visualise the information which is key for you

### Slide 6 :

We have two possible business models

## Revenue model



Social platform revenue

Business consulting revenue

### Social platform revenue



We would have a premium option where people would be able to see connections than the basic user.

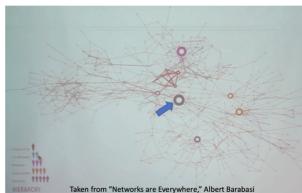
This follows a similar model to Tinder where you can get a premium account to view more accounts on the platform

### Slide 7 :

This is discussed in the initial business plan

Remember the revenue model

### Business consulting revenue



Taken from "Networks are Everywhere," Albert Barabasi

Taken from "Networks are Everywhere," Albert Barabasi

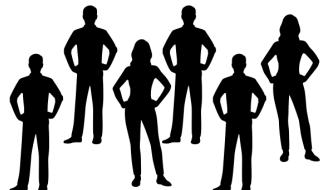
### Slide 8 :

This is discussed in the initial business plan

Remember the revenue model

### Business consulting revenue

Building teams



### Slide 9 :

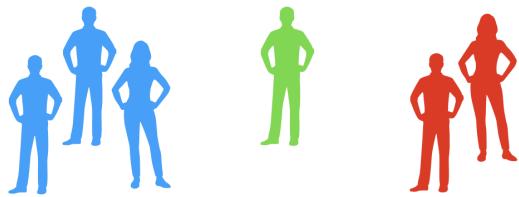
This is discussed in the initial business plan

Remember the revenue model

### Slide 10 :

This is discussed in the initial business plan

## Business consulting revenue Segmentation in the network

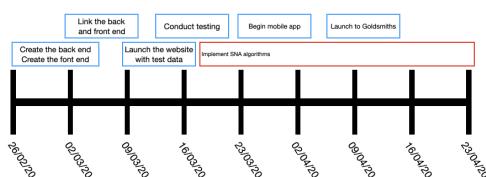


Remember the revenue model

### Timeline

Slide 11 :

This is the time line for the project



## Week 6 report

### Project manager comments :

Semi working mvp, needs to work with data

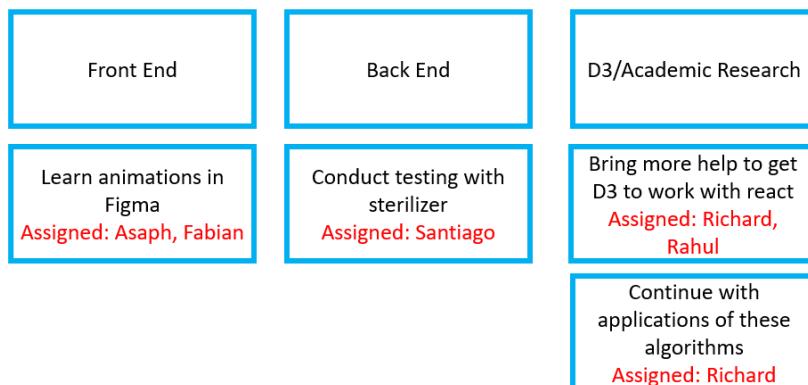
### Review of team work collaboration :

### Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Bring on more help to get D3 to	Try to generate JSON data for d3 object as Nodes and links	To Represent the proper force directed graph	generating proper JSON data and	

work with react			representing graph
Conduct testing with serializer	Use Django serializer to Convert Database field into Respective variables.	To better understanding of accessing data into programming rather than using the database object.	Getting proper data into classes in Django framework.
Start learning how to do animations in Figma	Learning through official Figma documentation	For aesthetic purposes	A working animation on the site

## Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Bring on more help to get D3 to work with react	5	More people should have been working on the D3 stuff a long time ago. Bringing on more people has really helped	Continue working

			together with D3
Conduct testing with serializer	5	Getting proper data into objects in Django framework.	Implementing API requests
Start learning how to do animations in Figma	3	Progress was made but we are still in the learning stages.	Begin working on animations

## Notes on discussion with industry experts :

In our discussions with industry experts we pitched our product using our pitch deck which can be found in week 5.

### Who did we speak to

Joe Hellier from Connectd

Background : Joe Hellier is an associate investor at Connectd advisor

Why did we ask for their feedback : We wanted to see if an investor thought our project had any market potential and to see if the work we were doing could exist out of academia.

Feedback given : Joe suggested that we drop the revenue model in regards to consultancy. Most investors have a large amount of experience with consultancy and to be able to provide consultancy requires deep knowledge and experience which we lacked as a university start up. Joe suggested we focus on making a platform because investors are a lot more excited about emerging platforms and are more eager to invest.

Joe also had not heard anything similar to our product on the market making it unique. In addition to this he believed that Graf Us would be a very useful tool in general use but also described how a tool like this would be extremely useful in his personal work because he spends a lot of time on LinkedIn and tries to keep track of a wide range of connections.

Adrian De La Court Goldsmiths enterprise

Background : Adrian liked the idea of our product and believed that we had a very strong selling pitch and a unique idea. The draw backs are that because we want to be a platform we need to have some track record of being a working

platform. In order to gain investors we would need to start building up a user base in order to have some evidence that the platform is a viable. In addition to this Adrian also suggested that we not go into as much detail about the science of how our program works because we might reveal information that we might want to keep private in regards to how we suggest connections to the user.

## Actions taken based on feedback :

### Conduct testing with serializer :

The creating of serializer is by the use of classes, as shown on the screenshot below.

```
from rest_framework import serializers
from .models import User, Connection, Profile, Post

class UserSerializer(serializers.ModelSerializer):
    class Meta:
        model = User
        fields = ('email', 'password', 'first_name', 'last_name')

class ConnectionSerializer(serializers.ModelSerializer):
    class Meta:
        model = Connection
        fields = ('from_user', 'to_user', 'approval_status')

class ProfileSerializer(serializers.ModelSerializer):
    class Meta:
        model = Profile
        fields = ('user', 'description', 'college', 'university', 'current_company', 'hobbies')

class PostSerializer(serializers.ModelSerializer):
    class Meta:
        model = Post
        fields = ('user', 'title', 'caption', 'likes', 'created_at')
```

The result for the class "UserSerializer", is the following:

---

User

OPTIONS

POST /api/user

HTTP 201 Created  
Allow: POST, OPTIONS  
Content-Type: application/json  
Vary: Accept

```
{
  "email": "test@example.com",
  "password": "test_password",
  "first_name": "Santiago",
  "last_name": "Lopez"
}
```

Raw data    HTML form

Email: test@example.com  
Password: test\_password  
First name: Santiago  
Last name: Lopez

POST

The developers and testers can fill out these fields, submit and check the database to ensure the application is behaving in the correct manner.

Database result:

```
1 SELECT * FROM api_user ORDER BY id DESC;
```

line 1, column 41, location 40    No limit    Beautify    Run Current

id	email	password	first_name	last_name	created_at	date_of_birth
15	test@example.com	test_password	Santiago	Lopez	2022-03-30 13:28:54.678114	NULL

## Week 7 report

### Project manager comments :

Linking with the data

How to store the data for our visualisations

Tried storing it into a matrix but this became very ineffective

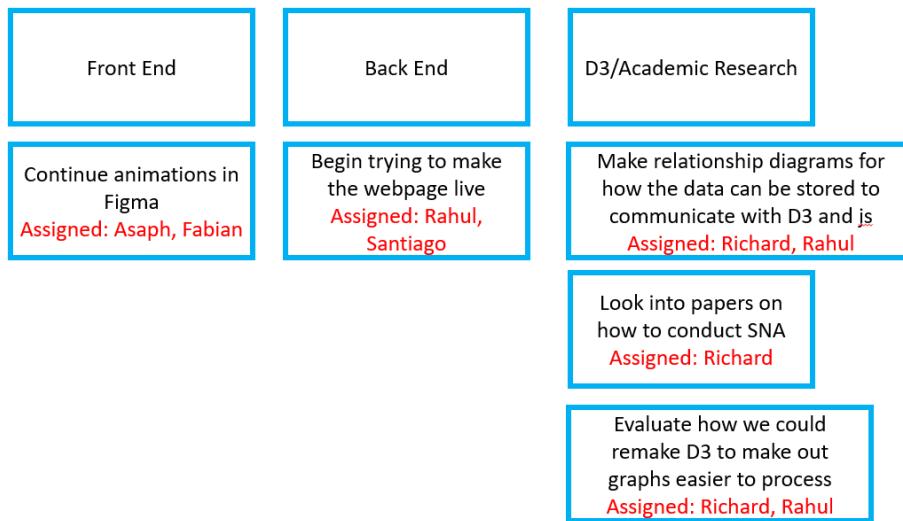
go into detail about how storing the data this way was bad

## Review of team work collaboration :

### Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Make relationship diagrams for how the data can be stored to communicate with D3 and js	Pass JSON Object to d3 Class with Nodes and Links to represent connection	To Represent the Force directed Graph	The Force Directed graph will successfully Represented with All grouping and connections.	
Begin trying to make the webpage live	Install All necessary modules for Django and ReactJs	Conduct the Test on Live project.	Rendering the all components of Frontend React and Handle the API requests.	
Look into papers how to conduct SNA	We found a very clear paper by the home office on how to conduct SNA. For this weeks reading we should make this the	The paper is very clear in its description and helps clear up a lot of confusion.	To have clear notes on the paper	
Continue work on Figma animations	Watching tutorials	Aesthetic purposes	A working animation on the site	

### Kanban :



## Evaluation of progress :

Goal	Grade out of 5 for success	Justification of success	next steps
Begin trying to make the webpage live	3	The Frontend React components are rendered successfully except the backend Django modules.	Try to Debug Code and find the module classes.
Make relationship diagrams for how the data can be stored to communicate with D3 and js	5	The Data given to d3 Class as a JSON object rendered the Force directed graph.	Try to represent Images and names into nodes in Force directed graph.

## How to guide on how to conduct SNA exploration

Social Network Analysis, 2016: 'how to guide'. Home Office, 978-1-78655-066-8. §

Context : This paper is a how to guide on how to conduct SNA. As there example they take a look at a criminal network and explain how SNA can be used to find salient individuals. This paper address a lot of the issues we ran into with development when trying to understand SNA.

The following notes have been adjusted to be appropriate for use in Graf Us. The original guide was aimed at gangs.

## Steps to follow when conducting SNA

### Step 1 :

Define the focus of the network you are looking at.

element	Issues with element	Considerations
To identify a grouping.	The grouping you decide on will need to be based on the industry or geographical area	For more accurate results the analysis should be done on smaller groupings. The larger the grouping the less likely the data will be complete
Individuals that associate with the group	The grouping may be too large to identify with limited resources	Are there any salient individuals that are already known
The time period	Taking in results over a longer period of time will give more accurate results but will take more time	Has the picture changed over time and how has it changed.
The size of the data set you want to collect	The size of the data set will affect the time to process to conduct SNA	Are you collecting enough data that you are able to do analysis

Graf Us can avoid some of the issues because of the nature of how Graf Us is structured. The analysis we intend to show users will be small in scale. We do not believe that showing the overall structure of the network will be useful to users who do not know how SNA works.

We are confident in our belief that providing large scale analysis will be useful because in our market research previous attempts by Linked In have been discontinued.

This allows us to avoid issues in regards to mapping out a grouping that is too large avoiding issues with time to process and the decreased accuracy with larger grouping.

Issues that Graf Us is still exposed to is having a data set that is too small to be able to do any analysis and that we will have missing points in our data resulting in inaccurate analysis.

### Step 2/3 :

Decide what data set we will use and collect the data. The data we will use will be collected from a users Linked In account.

### Step 4 : Analyse the findings

One method of doing analysis is by plotting the networks centrality score (degree and betweenness). Once you are able to work out the centrality score you can use the following table to label each individual to identify their role.

Role	Betweeness (Unique links to others in the network)	Degree (Connected to many individuals)	Characteristics
Gatekeepers	 Higher	 Lower	<ul style="list-style-type: none"><li>• May play an important role in activity, but not much information is held on them</li><li>• Removal may fragment networks</li></ul>
Highly visible figures	 Lower	 Higher	<ul style="list-style-type: none"><li>• May have information about many others in the network</li><li>• May be involved in lots of activity in the network, but do not play a unique role</li></ul>
Central figures	 Higher	 Higher	<ul style="list-style-type: none"><li>• Very visible and central role</li><li>• Key figures that may be focused on to fragment networks and to gather information</li></ul>

### Limitations of SNA :

SNA is based on the data that is able to be collected which has the potential to be incomplete. As a result the information can be inaccurate or untimely. SNA should be used in combination with in person experience of the network.

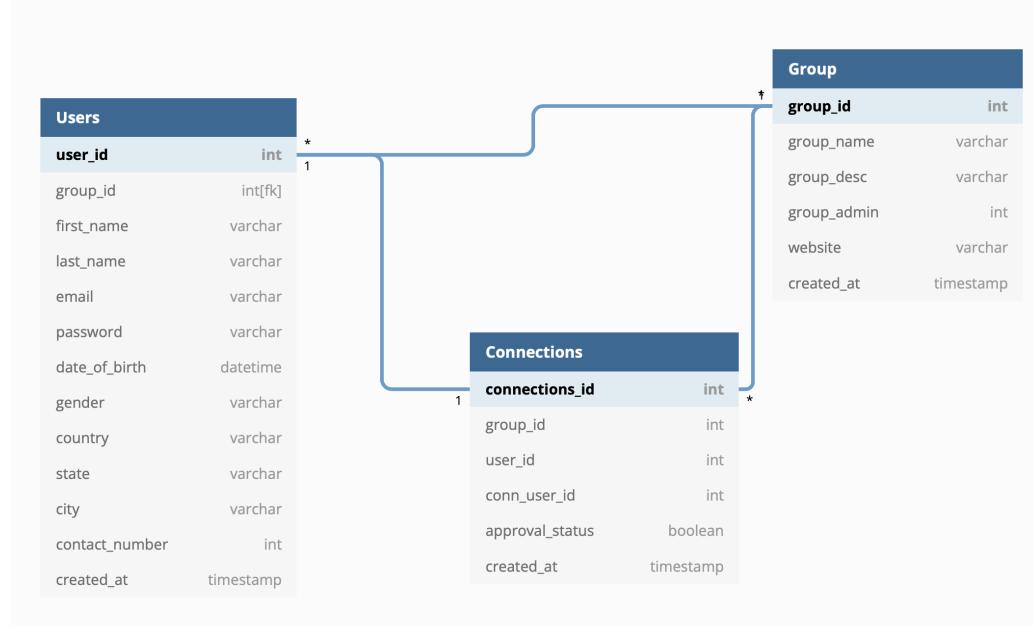
Next steps : We can use this guide to begin labeling individuals in our graphs to now identify salient individuals.

In addition to this the document contained a coding template to able to label the interactions between people in the network in more detail in order to give a better picture of what is happening in the network. For possible next steps we could try to

create our own coding template and find ways automate the coding process between individuals.

## Make Uml diagrams for how the data can be stored to communicate with D3 and js

### Making a Relational Database diagram for how to store our data



```

// Creating tables
Table Users as U {
    user_id int [pk, increment] // auto-increment
    group_id int[fk]
    first_name varchar
    last_name varchar
    email varchar
    password varchar
    date_of_birth datetime
    gender varchar
    country varchar
    state varchar
    city varchar
    contact_number int
    created_at timestamp
}

Table Connections as C {
    connections_id int [pk]
    group_id int
  
```

```

    user_id int
    conn_user_id int
    approval_status boolean
    created_at timestamp
}

Table Group as G {
    group_id int [pk, increment]
    group_name varchar
    group_desc varchar
    group_admin int
    website varchar
    created_at timestamp
}

// Creating references
// You can also define relationship separately
// > many-to-one; < one-to-many; - one-to-one
Ref: U.user_id > C.connections_id
Ref: U.user_id < G.group_id

```

## Week 8 report : Testing

### Project manager comments :

We managed to create a diagram that worked for the ego but failed to show connections

Show how we could show connections between groups

Needed a foreign key

### Review of team work collaboration :

#### Goals :

Goal	Approach	Reason	How to measure success	Assigned to
Testing with Faker	Use dummy data to try to load into the Database.	This is to test if data can be loaded into the system correctly	Data integrity and Data CRUD operation operating without data breach or modified data. Results of test cases in percentage: (number of passed test / number	

			of tests)*100. See tests ran below.	
Testing with JestJS Library (Frontend)	Integrating the JESTJs and React Testing tool into the frontend app in development mode.	Rendering component trees in a simplified test environment and asserting on their output	Some tools offer a very quick feedback loop between making a change and seeing the result, but don't model the browser behavior precisely. Other tools might use a real browser environment, but reduce the iteration speed and are flakier on a continuous integration server	,
Testing with Postman, Django Unit	Running the Django Backend framework and in local development environment and test API in postman tool.	Testing API operations with given proper params.	Comprehensive set of tools to accelerate the API lifecycle—from design, testing, Properly	,
Module Integration Testing Frontend and Backend	Giving different inputs with different types. Try different approach to access components.	Checking the functionality of the Application.	Fully functional application with integrating both backend and frontend with given different inputs and expected outputs.	

Django automated test cases (Unit testing):

```
(venv) MBP-de-Santiago:Graf_us santiago$ ls
Graf_us           manage.py
api              requirements.txt
db.sqlite3        venv
frontend

(venv) MBP-de-Santiago:Graf_us santiago$ python manage.py test
Found 3 test(s).

Creating test database for alias 'default'...
System check identified no issues (0 silenced).

...
-----
Ran 3 tests in 0.009s

OK
Destroying test database for alias 'default'...
(venv) MBP-de-Santiago:Graf_us santiago$ █
```

Django can run tests with the use of the command “`python manage.py test`”. This command generates temporary database records that are erased once the tests have ran, regardless of their outcome.

These unit tests have been developed by implementing the `UserTestCase` class, derived from Django’s `TestCase` class:

```

8     # Users unit tests
9  ►  class UserTestCase(TestCase):
10    # Generate fake, temporary data
11    email1 = fake.name().split()[0].lower() + '@gmail.com'
12    email2 = fake.name().split()[0].lower() + '@gmail.com'
13    password1 = fake.text(8)
14    password2 = fake.text(8)
15
16  ►  def setUp(self):
17      """Set up users unit tests"""
18      User.objects.create(
19          email=self.email1,
20          password=self.password1
21      )
22      User.objects.create(
23          email=self.email2,
24          password=self.password2
25      )
26
27  ►  def test_users_can_create_profile(self):
28      """Check users can create a profile correctly"""
29      user1 = User.objects.get(email=self.email1)
30      profile1 = Profile.objects.create(
31          user_id=user1.pk,
32          description=fake.text(255),
33          college=fake.name(),
34          university=fake.name(),
35          current_company=fake.name(),
36          hobbies=fake.text(255)
37      )

```

## Why we need Test

The Goal of software testing is to find errors, missing requirements or any flow which system will crash.

Software testing is a method of determining whether the actual software product meets the expected requirements and ensuring that the software product is free of defects. It entails running software/system components through their paces using manual or automated tools to evaluate one or more properties of interest.

The goal of software testing is to find errors, gaps, or missing requirements in comparison to the actual requirements.

When a software development project is going on, you need to know that errors may appear in any phase of the life cycle.

Few of them are known to be undiscovered. Thus, the importance of **Quality Assurance** cannot be ignored.

There are high chances that the final code has errors of functionality and design. For the identification of the issues before the occurrence in the critical environment, it is a prerequisite to performing the testing of software.

Software testing is important because if there are any bugs or errors in the software, they can be identified early and fixed before the software product is delivered. A properly tested software product ensures dependability, security, and high performance, which leads to time savings, cost effectiveness, and customer satisfaction.

It happens to be an integral part of the process. However, it involves a huge cut off from the pocket.

Nevertheless, you need to keep in mind that the price owing to the failure of the software can be really high.

Here are the top reasons why the testing of the software is really important:

## **Testing in Graf\_us Front End**

Write maintainable tests for React components. As a part of this goal, frontend want tests to avoid including implementation details of react components and rather focus on making tests give the confidence for which they are intended. As part of this, frontend want testbase to be maintainable in the long run so refactors of your components (changes to implementation but not functionality) don't break react tests and slow application and team down.

Graf us project we are using the tool called JestJs which using for module testing as well as the integration testing.

## **Authentication Module:**

In authentication module testing is taking place on the session management and user confirmation profile.

The Linkedin API are used for authentication we are check that taking place properly and the authentication code receive properly not getting shared in the network and stored in database properly.

```

const authView = require("../components/AuthView");

test("Getting linkedin Auth Code ", ()=>{
expect(authView.apply().toBe("bjhvad878698adsbkjba"))
})

test("Check the session Code", () => {
expect(sesion["Rahul"].toBe(true))
})

```

## Force Graph Test

Force graph is then representation of the connections in for of Nodes an Links with shows the presentation testing is taking place on Nodes and links(Connections) related too particular user from the database .

```

const forceGraf = require("../pages/ForceGraphVis");

test("Force Graph Node Check", ()=>{
    expect(forceGraf.arguments.toBe(Node))
})

test("Force Graph Connection Check", ()=> {
    expect(forceGraf[Symbol.hasInstance].toBe("Bind"))
})

test("Force Graph Responce", () => {
    expect(forceGraf.caller().toBe(true))
})

```

**PASS** `__tests__/Header.test.js`

- ✓ snap (11ms)
- ✓ mocks (2ms)
- skipped 3 tests

**Test Suites:** 1 **passed**, 1 total

**Tests:** 3 **skipped**, 2 **passed**, 5 total

**Snapshots:** 3 **passed**, 3 total

**Time:** 1.435s

Ran all test suites matching "Header".

## Tools Used for Testing:

JestJS is Tool using for front end testing.

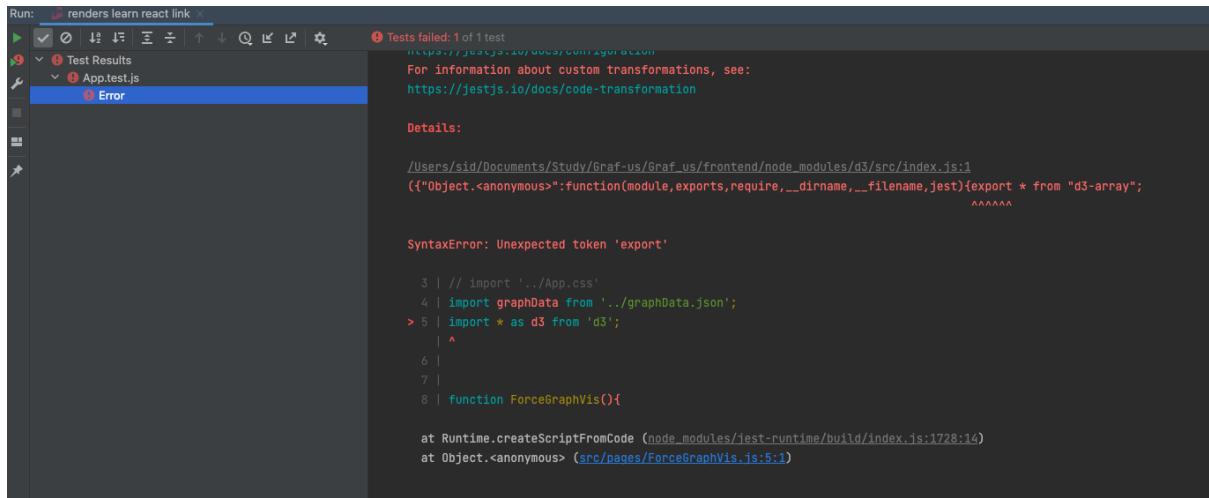
## Snapshot Testing with Jest

A similar approach can be taken when it comes to testing your React components. Instead of rendering the graphical UI, which would require building the entire app, you can use a test renderer to quickly generate a serializable value for your React tree.

```
import React from 'react';
import renderer from 'react-test-renderer';
import Link from '../Link';

it('renders correctly', () => {
  const tree = renderer
    .create(<Link page="http://www.linkedin.com">Linkedin</Link>)
    .toJSON();
  expect(tree).toMatchSnapshot();
});
```

## Failed Tests:



```
Run: renders learn react link x
  1 Tests failed: 1 of 1 test
  1 Test Results
    1 App.test.js
      1 Error

  Details:
  https://jestjs.io/docs/configuration
  For information about custom transformations, see:
  https://jestjs.io/docs/code-transformation

  /Users/sid/Documents/Study/Graf-us/Graf_us/frontend/node_modules/d3/src/index.js:1
  ("Object.<anonymous>":function(module,exports,require,__dirname,__filename,jest){export * from "d3-array";
  ^^^^^^

  SyntaxError: Unexpected token 'export'

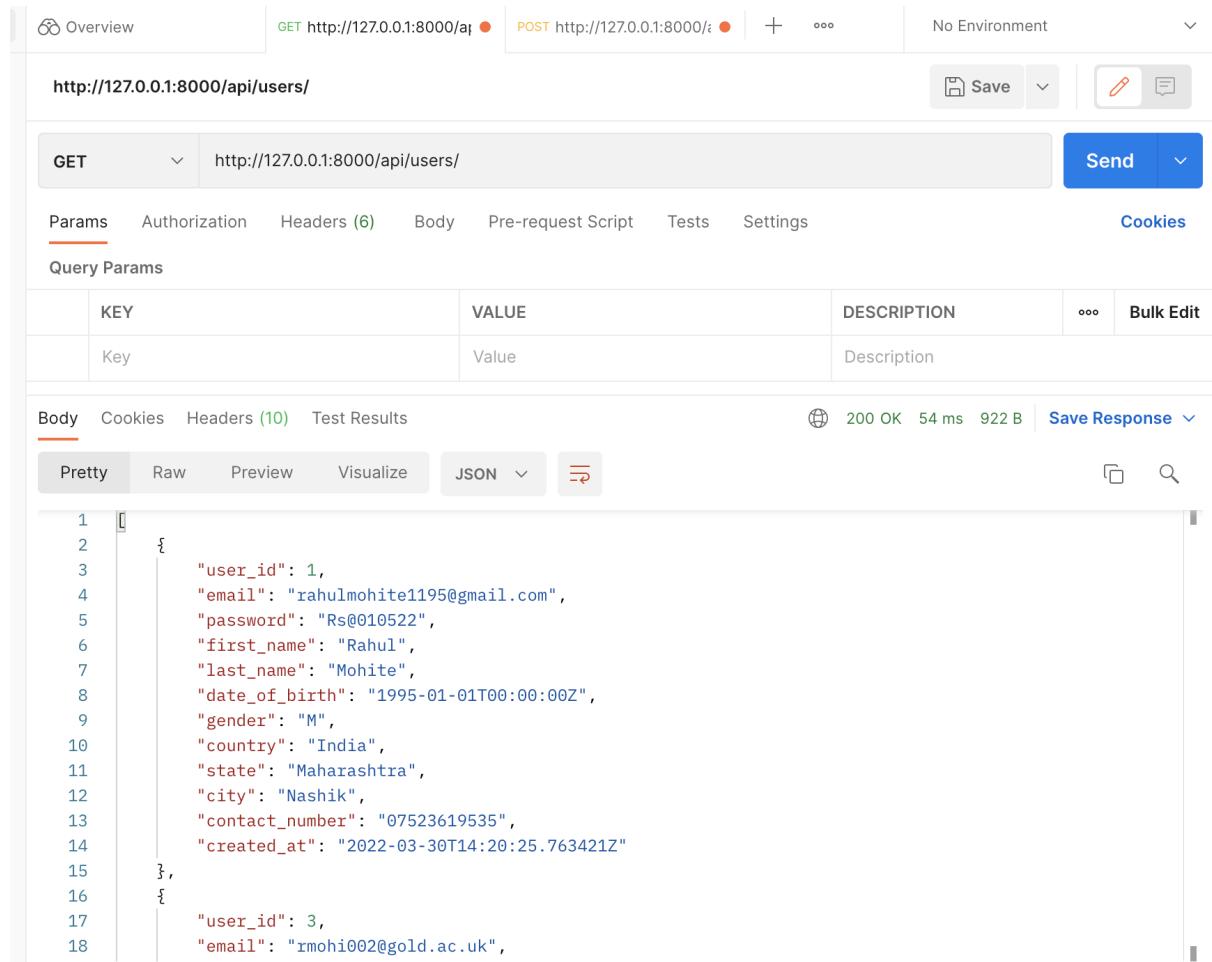
  3 | // import './App.css'
  4 | import graphData from './graphData.json';
> 5 | import * as d3 from 'd3';
  | ^
  6 |
  7 |
  8 | function ForceGraphVis(){

  at Runtime.createScriptFromCode (node_modules/jest-runtime/build/index.js:1728:14)
  at Object.<anonymous> (src/pages/ForceGraphVis.js:5:1)
```

While retrieving graph data from Database and connecting to d3 library was generating error because of the data formatting which used for the d3 library in the form of the nodes and links between the nodes in JSON format.

After getting the data from the database and arrange into the the JSON node and link format solved the error.

## Testing for Get and Post user Data Backend



The screenshot shows the Postman application interface. At the top, there are tabs for 'Overview', 'GET http://127.0.0.1:8000/api', 'POST http://127.0.0.1:8000/api', and 'No Environment'. Below the tabs, the URL 'http://127.0.0.1:8000/api/users/' is displayed. The main area shows a 'GET' request to 'http://127.0.0.1:8000/api/users/'. The 'Params' tab is selected, showing a table with a single row: 'Key' (Value) and 'Value' (Description). Below this, the 'Body' tab is selected, showing a JSON response with two user objects. The JSON is as follows:

```
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
{
  "user_id": 1,
  "email": "rahulmohite1195@gmail.com",
  "password": "Rs@010522",
  "first_name": "Rahul",
  "last_name": "Mohite",
  "date_of_birth": "1995-01-01T00:00:00Z",
  "gender": "M",
  "country": "India",
  "state": "Maharashtra",
  "city": "Nashik",
  "contact_number": "07523619535",
  "created_at": "2022-03-30T14:20:25.763421Z"
},
{
  "user_id": 3,
  "email": "rmohi002@gold.ac.uk",
```

Using the Django library in python the API is make the get requests from testing using the Postman (<https://www.postman.com>) tool.

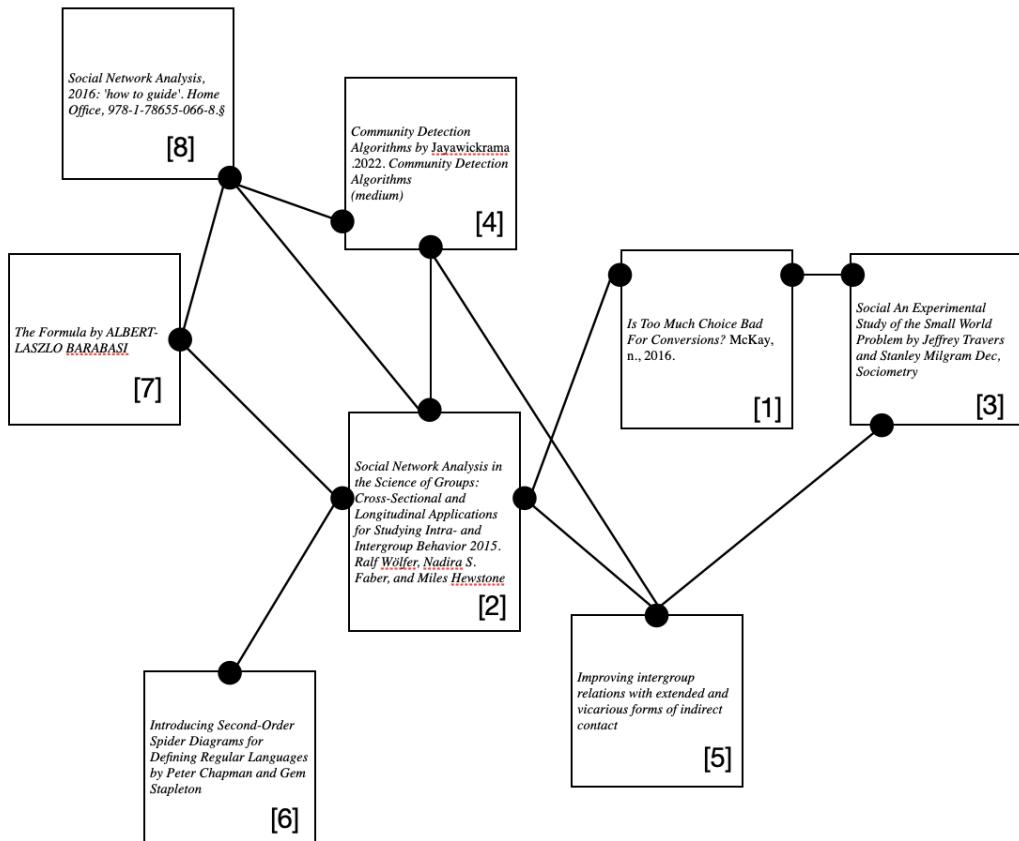
The screenshot shows the Postman application interface. At the top, there are two tabs: 'Overview' and 'No Environment'. Below the tabs, the URL 'http://127.0.0.1:8000/api/users/' is displayed. The main area shows a 'POST' request to the same URL. The 'Body' tab is selected, showing a JSON payload with 11 fields: user\_id (4), email (eaxmpale@domain.com), password (abkbkbkabxa), first\_name (FirstName), last\_name (LastName), date\_of\_birth (1995-01-01), gender (M), country (India), state (Maharashtra), city (Nashik), and contact\_number (+919876543210). The response status is 201 Created, with a response time of 17 ms and a size of 632 B. The response body is identical to the request body, indicating a successful creation of a new user record.

```
1 {
2     "user_id": 4,
3     "email": "eaxmpale@domain.com",
4     "password": "abkbkbkabxa",
5     "first_name": "FirstName",
6     "last_name": "LastName",
7     "date_of_birth": "1995-01-01",
8     "gender": "M",
9     "country": "India",
10    "state": "Maharashtra",
11    "city": "Nashik",
12    "contact_number": "+919876543210"
}
```

The post request testing for the registering the user data into database.

## Paper discussion :

# Paper relationship



The relationship shows the discovery path of how we found each paper and how they are related to each other within our reading.

In conclusion to be able to conduct social network analysis you need to follow the following steps :

Step 1 is to identify a group of individuals that you want to find connections for. This idea is explored in papers [8] and [2]. In both of the papers you can create an ego diagram to identify how an individual interacts with the group.

However relying on only the connections from an individual can result in inaccuracy because you are relying on the connections that individual has with in your data set. This can result in in blind spots within your data. To increase the accuracy of the data you should create a second degree ego diagram to enrich your data set [2] [8].

The groupings that you create should be based on geographical location or industry. This is because in paper [3] where the small world theory is tested these factors have the highest significance on the ability of an individual to create a chain of connections over any other factors you may look at. This makes these factors the most significant when looking at groupings.

Step 2 is to then store the data for the user. In paper [2] it is mentioned that a matrix can be used to store the data. A matrix is suitable for small scale research however when scaling the use of SNA up for use on a commercial scale the use of a matrix would be inappropriate. This is because as the number of nodes in the network increases it rapidly increases the amount of memory needed which is often wasted as a result of empty connections. Only a small segment of the network will dominate the number of connections in the network while most users will have very few connections in comparison. Thus resulting in the matrix being mostly empty. This is because the distribution of connections per person will follow a power law distribution. This means a few individuals are responsible for most of the connections. This is explored in source [7]

A linked list should be used over a matrix on a commercial scale because it is more space efficient. This idea has been explored in more depth in weeks five, six and seven.

Step 3 is to then apply a community detection method. Sources [2][4] and [7] explore a number of different methods for community detection algorithms. We decided to use the Louvain algorithm which is discussed in source [4]. This is because out of the different methods we saw the Louvain algorithm has the most literature and support available.

Step 4 : Once the communities have been discovered you can follow the methodology in paper 8 to be able to label each individual to identify their role with in the network.

Step 6 : Now that you have managed to identify salient actors within the network and have been able to identify different committees paper [5] has a number of different methods we can use to increase engagement. Most methods take advantage of salient individual who connect groupings and to help increase exposure between the groups .

## **Evaluation :**

### **How did we find the kanban :**

The Kanban was very effective in helping our team work in an agile manor. The simplicity of the Kanban made it very easy to pick up by each team member and its use on a cork board helped keep team members engaged in meetings. For the size of the team and the choice to priorities similarity and communication the Kanban was able to satisfy our needs.

### **How was Communication as a team :**

Team communication was clear for most of the project. Communication as a team dipped as external work loads increased which made it difficult for all team members to be engaged with the project at throughout. But overall as a team we worked very well together and communication even at the worse of times was still very clear.

### **Summative evaluation of our tests :**

The test we have done have shown some success for the front end and the back end. However because the scope of the project was so ambitious we were unable to integrate everything.

### **How successful was the enterprise part of the project :**

The enterprise part of the project saw some success and managed to gain some traction as we reached out to possible investors. The product had a market and was unique. However, because of the small size of the team and the range of tasks needed to be done the enterprise element of the project was dropped. The overall product needs to be developed more and to start building a user base before we can attract more serious and competitive investors.

### **How successful was the project :**

The project was successful in regards to its research. With in the paper discussion we have been able to create a complete method to conduct SNA and potential methods on how to alter the interactions between communities based on SNA. We have not been able to test this method unfortunately but given the time to complete the project this is by no means a failure.

In fact we have been highly successful for the given time frame because we have created a method based on scientific research. To be able to apply our findings we would have had to make a complete social platform with a healthy user base. This would be unrealistic given the time frame of the project.

We have also been successful in creating a working front end with visualizations in D3 which have been able to load fake data. We have also been able to create a successful back end which can store data. We were unable to link these but given

the size of the team and the number of technologies we had to learn in order to make the platform we set out to make we have been successful. We were able to learn all the technologies we set out to learn and we were able to build systems of them.

## **Future direction for Graf US :**

### **Realistic future :**

Richard and Rahul both have an interest in SNA. They are going to take their findings from this project to begin their work on creating academic papers in the field of SNA.

### **Ambitious future :**

For Graf Us to become a genuine platform we need to start building up a user base to be taken more seriously by investors. To build up our platform we could roll the platform out to the Hacksmiths society at the start of the next academic year.

Richard is the current acting secretary and Rahul sits on the board of the Hacksmiths society and to encourage the society to adapt the platform would be something that is in their influence to do so.

Once Graf Us is established within Hacksmiths areas of growth could be getting other societies to adapt Graf Us or to get the student union on board with making Graf Us the platform of choice when getting students to join a society and network. This would allow Graf Us to build a sizable platform which would have consistent growth each year because of its attachment to the universities societies.

## **Project Development Progress Logs:**

### **Github Project Branches:**

The screenshot shows the GitHub repository `SantiagoLopez-hub/Graf-us` with the `Active` tab selected in the navigation bar. The main content area displays a list of active branches, each with a small preview of its commit history and a `New pull request` button. The branches are listed in chronological order from top to bottom, with their last update time and author. Most branches have been merged, indicated by a purple `I-Merged` button. The branches include `Alpha`, `oauth-linkedin-authentication`, `automate-test`, `database-tables`, `implement-d3`, `frontend-update`, `create-project-2`, `presentation-frontend`, `Version-0`, `authentication`, `main`, `hope-this-works-this-time`, `more-ui-and-added-d3`, `added-page-updated-ui`, `added-responsiveness-first-auth-conditional-signup/login`, `updated-folders`, `implemented-chakra-ui`, `implement-onClick`, `development`, and `revert-3-Create-Project-2`.

Branch	Last Updated	Author	Commit Count	Merge Status
<code>Alpha</code>	3 hours ago	Santiago Lopez Paredes	0   60	<code>New pull request</code>
<code>oauth-linkedin-authentication</code>	3 hours ago	SantiagoLopez-hub	0   59	<code>#24 I-Merged</code>
<code>automate-test</code>	6 days ago	SantiagoLopez-hub	0   46	<code>#22 I-Merged</code>
<code>database-tables</code>	18 days ago	SantiagoLopez-hub	0   38	<code>#20 I-Merged</code>
<code>implement-d3</code>	21 days ago	Rahsai94	0   30	<code>New pull request</code>
<code>frontend-update</code>	22 days ago	fabiansimon	0   17	<code>New pull request</code>
<code>create-project-2</code>	2 months ago	SantiagoLopez-hub	4   1	<code>New pull request</code>
<code>presentation-frontend</code>	2 months ago	fabiansimon	28   43	<code>New pull request</code>
<code>Version-0</code>	2 months ago	fabiansimon	28   42	<code>New pull request</code>
<code>authentication</code>	2 months ago	Rahsai94	28   42	<code>New pull request</code>
<code>main</code>	2 months ago	fabiansimon	28   41	<code>New pull request</code>
<code>hope-this-works-this-time</code>	2 months ago	fabiansimon	28   40	<code>#14 I-Merged</code>
<code>more-ui-and-added-d3</code>	2 months ago	fabiansimon	28   37	<code>#13 I-Merged</code>
<code>added-page-updated-ui</code>	2 months ago	fabiansimon	28   36	<code>#12 I-Merged</code>
<code>added-responsiveness-first-auth-conditional-signup/login</code>	2 months ago	fabiansimon	28   32	<code>#11 I-Merged</code>
<code>updated-folders</code>	2 months ago	fabiansimon	28   30	<code>#10 I-Merged</code>
<code>implemented-chakra-ui</code>	2 months ago	fabiansimon	28   27	<code>#9 I-Merged</code>
<code>implement-onClick</code>	2 months ago	fabiansimon	28   24	<code>#6 I-Merged</code>
<code>development</code>	2 months ago	fabiansimon	28   19	<code>#5 I-Merged</code>
<code>revert-3-Create-Project-2</code>	3 months ago	Santiago Lopez Paredes	28   16	<code>#4 I-Merged</code>

## Project Development Progress Logs:

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Code Issues Pull requests Actions Projects Wiki Security Insights

Alpha

Commits on Mar 31, 2022

- Merge pull request #24 from SantiagoLopez-hub/oauth-linkedin-authentication... Verified cad7673
- Retrieve linkedin access token 161747f

Commits on Mar 30, 2022

- Perhaps closer to solution 07a43b7
- CORS linkedin auth issue raised a91ec3f
- Fix model implementation and POST handler 62d4f11
- Update default value for User table eb752ab

Commits on Mar 29, 2022

- Attempt linkedin save 3754a03
- change linkedin auth 3375ebd
- Authentication 8120cd5

Commits on Mar 25, 2022

- Merge pull request #22 from SantiagoLopez-hub/automate-test ... Verified 36cebab
- Commenting unit tests 1b78cd9

Commits on Mar 23, 2022

- Merge pull request #21 from SantiagoLopez-hub/automate-test ... Verified 65a7ed4
- Creating test for posts 8c83e73
- Cleaning code abd1297
- Test users can create profile db4d19c
- Use faker to generate data ebbe8f1
- Add faker module 4a195a1
- Check users can connect 8d29c59
- Create testing use case class 4aff7b7

Commits on Mar 13, 2022

- Merge pull request #20 from SantiagoLopez-hub/database-tables ... Verified 084b510
- Enable serialisers a49e248
- Merge pull request #19 from SantiagoLopez-hub/database-tables ... Verified 198431c
- Rearranging database table creation order dcbea3d

Commits on Mar 12, 2022

- Merge pull request #18 from SantiagoLopez-hub/database-tables ... Verified dff7469
- Update db.sqlite3 e158268
- Resetting table creation order ca5766d
- Set rule unique for connections f514a6c
- Resetting DB 636920c
- Profile table to take "id" as primary key 221d647
- Removing all python compiled files 7f969c6
- Update .gitignore 0523eb9

Commits on Mar 10, 2022

- Fixing Profile serialiser 1953721
- Create profile serialiser acd32a3
- Adding connection serialiser ca52646
- Create Post table 6c6e519

Newer Older

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Alpha

Commits on Mar 10, 2022

- Adding Profile table
- Creating Connections table
- Update .gitignore with all directories

Commits on Mar 9, 2022

- Attempt to fix join() issue in linux
- Updating git Ignore
- Changing DB to sqlite
- Create db.sqlite3
- Update .gitignore
- Update \_DS\_Store

Commits on Feb 13, 2022

- Updating babel

Commits on Feb 9, 2022

- Setting App.js in src folder

Commits on Feb 7, 2022

- Removing sqlite db conf
- Removing unnecessary \_DS\_Store

Commits on Feb 6, 2022

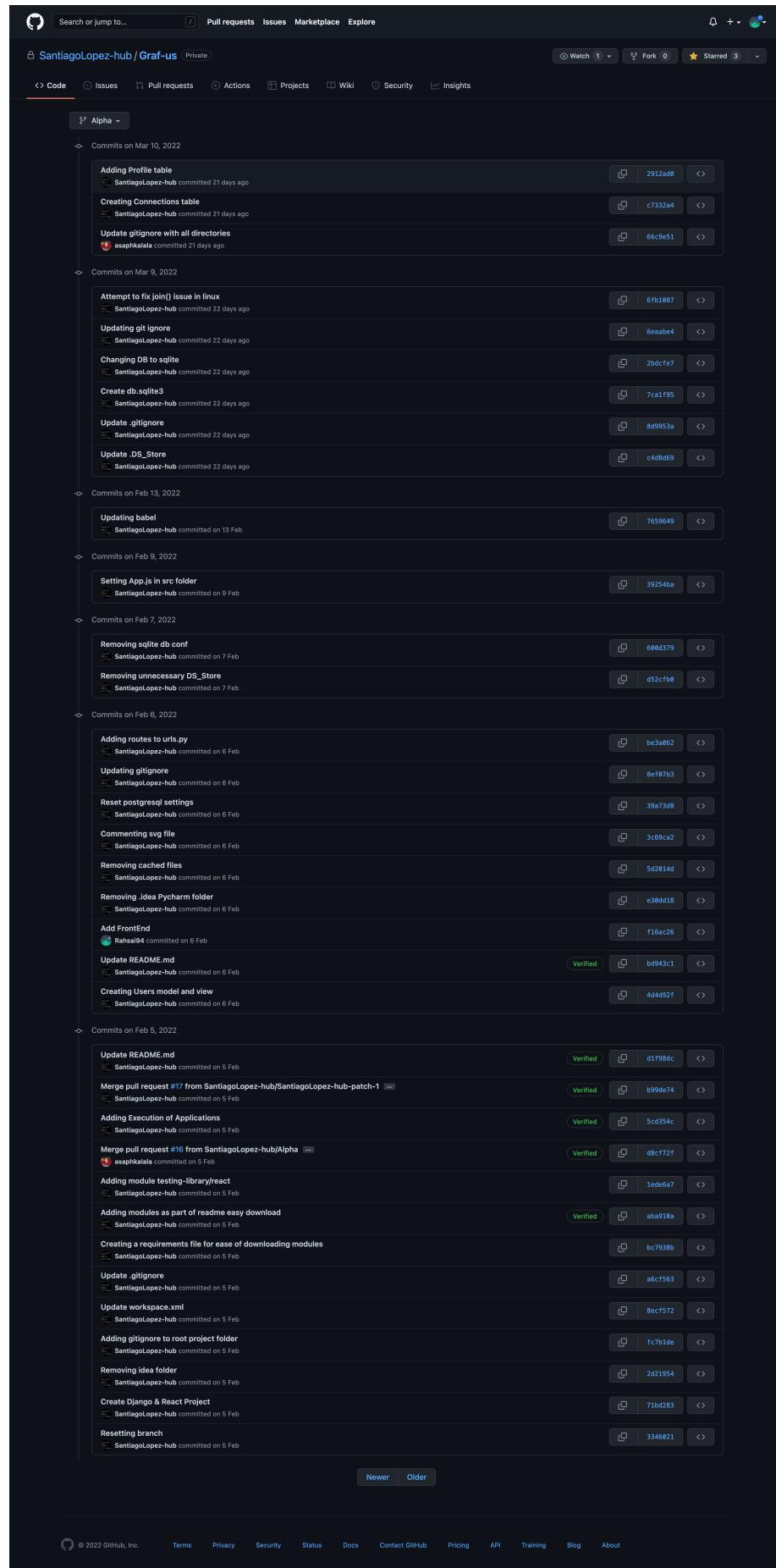
- Adding routes to urls.py
- Updating gitignore
- Reset postgresql settings
- Commenting svg file
- Removing cached files
- Removing .idea PyCharm folder
- Add FrontEnd
- Update README.md
- Creating Users model and view

Commits on Feb 5, 2022

- Update README.md
- Merge pull request #17 from SantiagoLopez-hub/SantiagoLopez-hub-patch-1
- Adding Execution of Applications
- Merge pull request #16 from SantiagoLopez-hub/Alpha
- Adding module testing-library/react
- Adding modules as part of readme easy download
- Creating a requirements file for ease of downloading modules
- Update .gitignore
- Update workspace.xml
- Adding gitignore to root project folder
- Removing idea folder
- Create Django & React Project
- Resetting branch

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Commits on Feb 1, 2022

- Merge pull request #14 from SantiagoLopez-hub/hope-this-works-this-time [Verified](#) 3d7ecf2
- updated some ui - added d3 [5baed5a](#)
- Merge pull request #13 from SantiagoLopez-hub/more-ui-and-added-d3 [Verified](#) 7e1cb8e
- added some more UI, functionality and implemented d3 [b55f7c4](#)
- Merge pull request #12 from SantiagoLopez-hub/added-page-updated-ui [Verified](#) c33f6a7
- added main page, updated some ui [cf941ee](#)

Commits on Jan 30, 2022

- Fixing typos [a998fac](#)
- Update .DS\_Store [1e67952](#)

Commits on Jan 27, 2022

- Merge pull request #11 from SantiagoLopez-hub/added-responsiveness-fix [Verified](#) 18876b6
- responsiveness, first auth, conditional rendering [a283361](#)
- Merge pull request #10 from SantiagoLopez-hub/updated-folders [Verified](#) 2be269e
- updated folders [539b926](#)
- Merge pull request #9 from SantiagoLopez-hub/implemented-chakra-ui [Verified](#) 2624700
- Create CText.js [e24ced3](#)
- Merge pull request #8 from SantiagoLopez-hub/implemented-chakra-ui [Verified](#) 55c75cd
- implemented chakra ui [29931ae](#)
- Merge pull request #6 from SantiagoLopez-hub/implement-onClick [Verified](#) a2d6834
- implement-onClick [8f22572](#)

Commits on Jan 26, 2022

- Update README.md [2ad9e55](#)
- Update README.md [91cae65](#)
- Update README.md [5c8490b](#)
- Merge pull request #5 from SantiagoLopez-hub/development [Verified](#) c9fb794
- setup ReactJS project + Login Page [2429312](#)

Commits on Jan 20, 2022

- Removing mongodb and flutter framework [ca923f6](#)

Commits on Jan 7, 2022

- Merge pull request #4 from SantiagoLopez-hub/revert-3-Create-Project-2 [Verified](#) 2b07fb7
- Revert "Create project 2" [ca78861](#)
- Merge pull request #3 from SantiagoLopez-hub/Create-Project-2 [Verified](#) e797c55

Commits on Jan 5, 2022

- Merge pull request #2 from SantiagoLopez-hub/revert-1-Create-Project [Verified](#) 482c432
- Revert "Create project" [b09b58a](#)
- Merge pull request #1 from SantiagoLopez-hub/Create-Project [Verified](#) dd9452a

Commits on Jan 4, 2022

- Including Installation instructions [3a2100d](#)
- Adding React as front end to the project [5f39af4](#)
- Installing packages [fb5b894](#)
- Create frontend django project [ec992a7](#)
- Changing url endpoint from "home" to "room" [598cdff](#)

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implement-d3 -

Commits on Mar 10, 2022

- Moving d3 changes (Rahsail94 committed 21 days ago) 3872a46
- Fixing Profile serialiser (SantiagoLopez-hub committed 21 days ago) f953721
- Create profile serialiser (SantiagoLopez-hub committed 21 days ago) acd32a3
- Adding connection serialiser (SantiagoLopez-hub committed 21 days ago) ca52646
- Create Post table (SantiagoLopez-hub committed 21 days ago) 6c5e619
- Adding Profile table (SantiagoLopez-hub committed 21 days ago) 2912ad0
- Creating Connections table (SantiagoLopez-hub committed 21 days ago) c7332a4
- Update gitignore with all directories (assphikala committed 21 days ago) 66c9e51

Commits on Mar 9, 2022

- Attempt to fix join() issue in linux (SantiagoLopez-hub committed 22 days ago) 6fb1087
- Updating git ignore (SantiagoLopez-hub committed 22 days ago) 6eaa8e4
- Changing DB to sqlite (SantiagoLopez-hub committed 22 days ago) 2bdcfe7
- Create db.sqlite3 (SantiagoLopez-hub committed 22 days ago) 7ca1f95
- Update .gitignore (SantiagoLopez-hub committed 22 days ago) 8d9953a
- Update .DS\_Store (SantiagoLopez-hub committed 22 days ago) c4d8059

Commits on Feb 13, 2022

- Updating babel (SantiagoLopez-hub committed on 13 Feb) 7659649

Commits on Feb 9, 2022

- Setting App.js in src folder (SantiagoLopez-hub committed on 9 Feb) 39254ba

Commits on Feb 7, 2022

- Removing sqlite db conf (SantiagoLopez-hub committed on 7 Feb) 680d379
- Removing unnecessary DS\_Store (SantiagoLopez-hub committed on 7 Feb) d52cf08

Commits on Feb 6, 2022

- Adding routes to urls.py (SantiagoLopez-hub committed on 6 Feb) be3a062
- Updating gitignore (SantiagoLopez-hub committed on 6 Feb) 8ef07e3
- Reset postgresql settings (SantiagoLopez-hub committed on 6 Feb) 39a73d8
- Commenting svg file (SantiagoLopez-hub committed on 6 Feb) 3e69ca2
- Removing cached files (SantiagoLopez-hub committed on 6 Feb) 5d2814d
- Removing .idea Pycharm folder (SantiagoLopez-hub committed on 6 Feb) e38dd18
- Add FrontEnd (Rahsail94 committed on 6 Feb) f16ac26
- Update README.md (SantiagoLopez-hub committed on 6 Feb) bd943c1
- Creating Users model and view (SantiagoLopez-hub committed on 6 Feb) 4d4d92f

Commits on Feb 5, 2022

- Update README.md (SantiagoLopez-hub committed on 5 Feb) d1f98dc
- Merge pull request #17 from SantiagoLopez-hub/SantiagoLopez-hub-patch-1 (SantiagoLopez-hub committed on 5 Feb) b99de74
- Adding Execution of Applications (SantiagoLopez-hub committed on 5 Feb) 5cd354c
- Merge pull request #16 from SantiagoLopez-hub/Alpha (assphikala committed on 5 Feb) d8cf72f
- Adding module testing-library/react (SantiagoLopez-hub committed on 5 Feb) 1ed6e67
- Adding modules as part of readme easy download (SantiagoLopez-hub committed on 5 Feb) abe918a
- Creating a requirements file for ease of downloading modules (SantiagoLopez-hub committed on 5 Feb) bc7938b
- Update .gitignore (SantiagoLopez-hub committed on 5 Feb) a6cf563

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1. Andrew Messenger and Jon Whittle, "Recommendations based on user generated comments in social media", *IEEE International Conference on Privacy Security Risk and Trust and IEEE International Conference on Social Computing*, pp. 505-508, 2011.
2. Akram Al-Kouz and Sahin Albayrak, "An Interests Discovery Approach in Social Networks Based on Semantically Enriched Graphs", *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, pp. 1272-1277, 2012.

## References :

1. *Is Too Much Choice Bad For Conversions?* McKay, n., 2016. [online] Available at: <<https://www.endlessgain.com/blog/is-too-much-choice-bad-for-conversions/>> [Accessed 29 February 2022].
2. Social Network Analysis in the Science of Groups: Cross-Sectional and Longitudinal Applications for Studying Intra- and Intergroup Behavior 2015. Ralf Wölfer, Nadira S. Faber, and Miles Hewstone
3. Social An Experimental Study of the Small World Problem by Jeffrey Travers and Stanley Milgram Dec, *Sociometry*, Vol. 32, No. 4 (Dec., 1969), pp. 425-443 Stable URL: <http://www.jstor.org/stable/2786545>
4. *Community Detection Algorithms* by Jayawickrama ., 2022. *Community Detection Algorithms* [online] Available at <<https://towardsdatascience.com/community-detection-algorithms-9bd8951e7dae>> [Accessed 29 February 2022].
5. Improving intergroup relations with extended and vicarious forms of indirect contact. Published in the European Review of Social Psychology. Written by L. Vezzali, Miles Hewstone, Dora Capozza, Dino Giovannini
6. Introducing Second-Order Spider Diagrams for Defining Regular Languages by Peter Chapman and Gem Stapleton
7. The Formula by ALBERT-LASZLO BARABASI
8. Social Network Analysis, 2016: 'how to guide'. Home Office, 978-1-78655-066-8.§

9. Kumar, M., 2022. *The BugsBee Social Networking App - Dot Com Infoway*. [online] Dot Com Infoway. Available at: <<https://www.dotcominfoway.com/case-studies/the-bugsbee-social-networking-app-case-study/#gref>> [Accessed 30 March 2022].
10. Testing Framework for Frontend <https://jestjs.io>
11. Postman API Requests Testing Tool Definitions <https://www.postman.com>
12. React Testing Library <https://testing-library.com/docs/react-testing-library/intro/>
13. Yingzi Jin, Yutaka Matsuo, and Mitsuru Ishizuka: Extracting Inter- Firm Networks from World Wide Web Using General-Purpose Search Engine, Journal of Online Information Review, Vol 32, no. 2, 2008
14. Yi Han. The research to several key issues of social network analysis and mining. National University Of Defense Technology.2011.
15. Newman M E J. Fast al gorithm for detecting community structure in networks [J]. Phys Rev E, 2004, 69(6): 066133.
16. Linked Lists vs. Arrays <https://towardsdatascience.com/linked-lists-vs-arrays-78746f983267>