P1A: Project Proposal

1. **Your motivation and understanding of the task (and general problem space).**

We are working on a rideshare design to connect Georgia Tech commuters who have similar schedules and destinations. While a majority of students do live on campus, there are still accommodations that can be made that will benefit both the environment and Georgia Tech. Single-rider commuters face the frustration of high gas prices, expensive parking passes, and what can be a long and lonely commute. Carpooling is a viable option for the single-riding commuters to reduce the cost of commute, but they have hard time finding partners to carpool with or managing the carpool in an efficient way.

In order to better understand the problem commuters face in carpooling, we need to gather data on students or faculty who would use this design, such as any frustrations in their commute and what incentives would encourage them to carpool. We anticipate that there are number of concerns users might have, such as whether it is safe, how much it would cost, etc. Cost is the primary concern of commuters. Compared to schools like Georgia State, Georgia Tech is much less commuter friendly, based on factors like more expensive parking passes ($400/semester vs $215/semester at GA State) and having less areas for free student parking.

2. **A description of the important characteristics of the user groups you are focusing on.**

After identifying commuters on Georgia Tech campus as a user group with both a supply and demand of services, we divided them further into four user groups: single-rider commuters, those who already carpool, locals who may need to go home solely on the weekends, and commuters who already use a public method of transportation but would prefer to carpool. Each of these subgroups have their own needs and wants that would constitute a shared economy, for example, single-rider commuters who bear the burden of gas may be interested in sharing their car space in exchange for alleviating some of the financial burden.

A few important characteristics of these user groups include: what aspect of carpool seem unattractive, whether they currently have a secure method of commuting, any incentives that would encourage them to carpool, their personal riding experiences and habits, and how satisfied they are with their current method of transportation and why.

3. **Data you will need to collect to learn more about your users (e.g., interview data, web content, and ethnographic observation data)."**

To understand the common problems and characteristics of our user groups, we will collect data through ethnographic observation and interviews. Interview questions will provide us with a general picture of our user groups, such as the times and destinations of their commutes, how they get to school, what frustrations they face, etc. The major question of our interview will be, of course, whether they would be interested in such a service and what factors might encourage them to carpool - financial,

environmental, personal. Commuting on campus is clearly an area that can be improved, but are there any groups on campus that would be actually interested in such a service? This data would help us identify whether there is enough of a need and enough of a supply for our design.

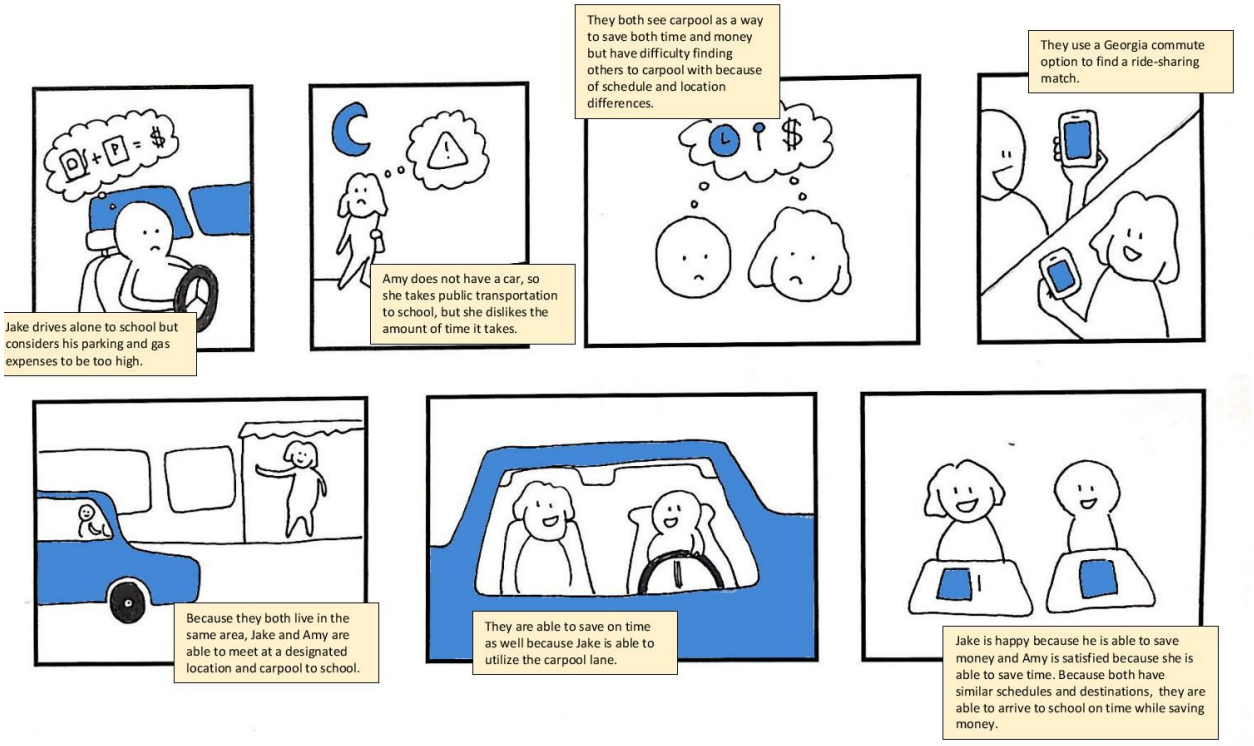
Through observation of our user groups, we can collect information and identify potential issues that, while obvious to us, the commuters themselves are oblivious to. We will observe how punctual they are, their typical driving habits, and also what frustrates them about their commute. To further our research, we will look into collective data as well, such as the percentage of commuters on campus, the ratio of carpool permits relative to individual permits, and possibly request information from GT Parking on how an increase in carpool might affect both their department and the GT community.

4. Post-feedback edition

After the presentation of our idea, we have modified above proposal according to the feedbacks we have received. Main feedback we received was the inclusion of implementation-oriented statements in our proposal. We have omitted implementation-oriented statements from the proposal and replaced them with statements that address our problem. Although in the our initial proposal we sought to conduct ethnographic observation, we decided not to do so. Detailed reasons behind the decision are discussed in P1B 4.a.

P1B: User Research

1. Task narrative



2. Now, give us a few more details.

Commuters within Georgia Tech are our target group. They perform the task of commuting on the road to and from Georgia Tech and their homes in either the privacy of a personal vehicle or the openness of public transportation. However, their primary task is wrought with inconveniences and inefficiencies. The commute can be long and lonely with frequent interruptions. They face interruptions from the stop and go congestion of traffic, the necessary gas stops, and the often time consuming search for the perfect parking spot that minimizes the distance from their car and first class.

On top of the inconveniences that interruptions cause commuters, their commuting interactions are constrained. They're restricted to certain parking areas by their parking permits. They're restricted to specific carpool arrangements by their carpool parking permits. They're restricted on who they can carpool with by who they know that they also share class schedules with. Commuters without a vehicle of their own face constraints by having to rely on someone else for the success of their commute. A commuter's finances are constrained by the burden of paying for gas, twice daily public transit, or the maintenance that daily dependence on a vehicle leads to. Commuters within their own cars face private but lonely commutes. Commuters that rely on public transit deal with the complete lack of privacy and potential threats to safety. With commuting daily causing such problems, one may wonder why someone might commute at all.

One major reason commuters choose to commute is the expense of living on or near campus. Commuting provides financial alternative to paying expensive rents of on-campus housing or midtown apartments. Among those who choose to commute, single riders who drive alone enjoy the freedom of travel without having to worry about someone else's schedule. However, there are downsides to commuting alone. HOV lane on highway I-85 provides a fast lane for vehicles with multiple passengers. Single riders are restricted from using this lane and must pay heavy fine($75 at first offense) if caught while using it. Single riders also bears the full financial burden of commuting, namely gas and parking permit cost, on their own. In a broader perspective, each commuter who rides alone adds to the total environmental cost, which can be reduced by sharing the rides thereby reducing the number of vehicles on the road.

Commuters who are interested in carpooling as a way to solve the problems posed by single riding either personally contact potential participants and receive carpool parking permit from GT Parking & Transportation services, or use existing carpool platforms to search for participants.

Among the existing services are GT Carpool permit option as well as ZimRide. Although these options solve the baseline problem of commuting inefficiently by yourself, it does so in an ineffective manner. GT Carpool permit places too much responsibility on the leader by relying on them to personally apply for the carpool, invite other people to said carpool, pay for and be responsible to receive fees from other members, and report any problems concerning the group. As for ZimRides, it does provider a healthier alternative to the Carpool rideshare option, however because it is not well advertised to its potential users and for its users , it not known by or used by most and as of now does not provide updated information to access it's services. Additionally, ZimRides is not a free service, and does not provide methods of accountability for problems that may occur including false accounts, and lack of punctual commitment from it's users.

2C

a) Describe the general space you plan to study (2-3 sentences)

Our general problem space is commuting. We want to observe what problems Georgia Tech commuters that are interested in carpool face and how we can provide solutions for these problems

b) What is the specific problem that you are trying to solve or need that you are trying to address? We will refer to this as the *The Problem.*

Specifically the problem with commuting comes down to the high financial cost, environmental cost, and its lack of flexibility. Commuting is expensive. Owning and maintaining a vehicle is costly. Using public transportation may be cheaper than driving to commute, but it takes longer to reach the destination. By sharing the ride through carpool, commuters can enjoy the timeliness of driving at a lesser cost. Ridesharing also reduces the environmental effects of traffic by reducing the number of vehicles on the road.

- Is technology really a necessary solution to *The Problem*? Why?

One of the major aspects of the problem is the inflexibility of commuting and carpooling. It is difficult to find a group of people with similar enough schedules to allow for consistent carpooling. For example, desired arrival and departure times to and from campus need to be coordinated, and the days that the group wants to carpool need to be configured as well. So the underlying problem here is that people want to connect and communicate with one another, but have trouble doing so. With this in mind, seeing as technology is the main method of communicating and connecting one person to another, we find adding technology to be a necessary solution to the problem of inefficient commuting. Although other options are available for communicating and connecting one person to another without the use of technology, they are lackluster and would not provide a better option than what is currently available today.

- Describe an approach to addressing *The Problem* that does not rely on technology.

  Someone who commutes to and from Georgia Tech that is interested in reducing their environmental footprint and cutting their costs can look into using the Georgia Tech carpooling parking permit which is 100 dollars cheaper than the normal parking permit. Georgia Tech's carpooling permit allows for a single person to seek out those to add to their carpooling team. The driver then registers their team with Georgia Tech parking and splits the cost equally with their teammates. However, if someone drops out of the carpool, this team captain is responsible for providing the vacant member's portion of the payment.Though this method does cut down on the financial and environmental cost of commuting, it doesn't allow for flexibility as the carpool team is susceptible to unexpected changes that are not appropriately accounted for. A method that doesn't use technology that addresses inflexibility would be public transportation. Public transportation allows Georgia Tech commuters to decide what time they want to leave for campus, is relatively inexpensive, and has a smaller environmental impact than driving personal vehicle to campus everyday. Nevertheless, using public transportation takes longer than driving and sharing a personal vehicle. Taking a bus, for instance, means that there will be several stops along the way instead of a direct route.

- What might you lose if you were to introduce poorly-designed technology to solve *The Problem*?

  On the other hand, a poorly designed integration of technology can also lead to a poor user experience. If we were to introduce poorly designed technology to aid commuters, users might become disinterested in using the technology. Specifically if using the technology is difficult to understand or if using the service is too time consuming users would not consider using the service again. Also if the poorly designed technology doesn't actually address the problem it was intended to fix, the users might be left with more frustration using our design than not using it.

c) **Search (to learn more about *The Problem*)**. What sites (e.g., reddit, quora, Nextdoor, GT website, Facebook groups, news articles, product pages, etc.) have you visited to investigate *The Problem*? Any physical locations or non-Internet-based resources can be included here too, but you will need to spend more time describing it.

Source title	Source URL	Dates of access (list all)	Informative?	If informative, why?
Carpooling | Clean Commute Modes | Save Your Commute | Georgia Commute Options	http://gacommuteoptions.com/Save-Your-Commute/Clean-Commute-Modes/Carpooling	2/10/18	Yes	This website informed us about the carpooling aide that Georgia Commute Options supplies
Carpooling Incentives for Georgians	https://georgia.gov/blog/2015-05-14/carpooling-incentives-georgians	2/10/18	Yes	This website informed us about what would motivate a commuter that doesn't already carpool.
Carpool and Rideshare | Parking & Transportation Services | Georgia Institute of Technology | Atlanta, Ga	https://pts.gatech.edu/carpool-rideshare	2/10/18	Yes	Informed us about what carpooling options that Georgia Tech offers and these solution's limitations.
Your Commute is Costing You More Than You Realize	https://www.reuters.com/article/us-usa-commute-costs/your-commute-is-costing-you-more-than-you-realize-idUSKBN0E721M20140527	2/10/18	Yes	Informed us about the financial costs commuters face.
How Commuting Impacts the Environment	https://rideamigos.com/blog/commuting-impacts-environment/	2/10/18	Yes	Informed us about the environmental cost of commuting.

d) **Compare (Related Solutions)**. List at least 5 products, services, or research prototypes that are directly or indirectly related to *The Problem* (prioritize those that are designed to solve it--even if only a partial solution is evident). They can be--but do not need to be--high tech, in fact they needn't be computing technologies at all (e.g., a physical space that people walk to, to donate food for others in need).

1. ZIMRIDE

    a. Name: Zimride
    b. Found at: https://zimride.com/
    c. What it provides: Allows for members of a certain University's community to connect with drivers that are also a part of the community. Users make profiles to portray information such as what they are looking for in relation to from where to wear they are comfortable with giving or receiving rides and use empty seats to do so. The service also allows for users to pay the riders through paypal.
    d. People that belong to a shared company or University. Specifically it targets those of the community that have empty seats in their car that would like to make some money and wouldn't mind giving others in their community a ride. This is also good for those in the community that would like to carpool or need a ride home.
2. GT CARPOOL PERMIT
    a. Name: GT Carpool Permit
    b. Found at: https://pts.gatech.edu/carpool-rideshare
    c. What it provides: It allows for Georgia Tech students and staff that live more than a half a mile away from Georgia Tech's campus to split the cost of a cheaper Georgia Tech parking permit with other members of a carpooling team that they must register with Georgia Tech parking.
    d. The target user groups for this permit are Georgia Tech students and staff that live more than a half a mile away from Georgia Tech's campus that would like to carpool and pay less for Georgia Tech's parking permit.

3. GEORGIA COMMUTE OPTIONS
    a. Name: Georgia Commute Options
    b. Found at: http://gacommuteoptions.com/
    c. What it provides: It allows for Georgia residents to find others in their community that would be suitable carpool matches based on schedule and geographic area. It allows for users to sign up for vanpools. It also has a service that will allow users to find a guaranteed ride home that they can access on demand. It also has information on public transport information.
    d. The target users are Georgia Residents that would like to find an alternative mode of commuting to work or school besides driving oneself. It targets users that would like to pilot a van or car pool. It also targets users that would like to carpool but don't want to drive.
4. UBER
    a. Name: Uber
    b. Found at: app store
    c. What it provides: Uber provides a service that provides on demand transportation from those in your area. Drivers can register through uber to become drivers and they receive compensation from uber. Riders that would like a ride sign up to the service to pay for rides.
    d. Their target users are those with a car that would like to make some extra money and those that need rides.

5. LYFT
    a. Name: Lyft

b. Found at: app store
c. What it provides: Lyft provides a service that provides on demand transportation from those in your area. Drivers can register through Lyft's website to become drivers and, they receive compensation from Lyft. They can also receive tips from riders. Riders that would like a ride sign up to the service to pay for rides.
d. Their target users are people in the community with a car and those in the community that would like a ride to a destination.

e) **Synthesize**. Using the results from your review of existing solutions, provide a summary of your findings. You should include:

1. *Strengths of existing products, services, or prototypes.*

All of the solutions above are helpful in reducing the financial cost of commuting by aiding users in carpooling. But there are additional features that make these solutions even more useful. Zimride provides flexibility by allowing arrangements to carpool to be made up to 24 hours ahead of time. Zimride also makes it easier for carpoolers to find and communicate with each other by connecting them. Zimride is cheaper than single commuting because, from the users' perspective, there is no need of a Georgia Tech parking permit at all and, from the drivers' perspective, there is monetary compensation. Zimride is also great in the fact that it can be accessed both through mobile methods and at a desktop computer. The Georgia Tech carpooling permit is also a good option for the Georgia Tech community. It saves commuters money by allowing members of the Georgia Tech community to purchase a cheaper parking permit and split the cost of said permit with other people.

Georgia Commute Options provides flexibility by allowing users to connect with other carpoolers based on the similarity of their schedules and destinations, and giving users the option to join either a carpool or a vanpool. Georgia Commute Options also gives users the ability to access the service online or through their mobile devices. The service offers reliability by having a function where users can automatically organize a ride home. Uber and Lyft offer the most freedom to their users by allowing the users to organize rides on demand. They also make it easy for those that need a ride to get in contact with those that are able to provide one. They even allow users to exchange payment through the service.

2. *Identified gaps in existing products, services, or prototypes.*

Though the available solutions have some extremely helpful aspects, each of these solutions has some sort of shortcoming. Zimride no longer includes coverage of Georgia Tech's campus. Zimride also caters to the case by case situation instead of allowing users the option to set up a long term carpooling arrangement with a group of people. Georgia Tech's carpool permit is lacking because it doesn't offer flexibility. Once a carpool team has been formed, the captain of the carpool team cannot be changed. This means that if the carpool team captain decides to stop carpooling, the whole team is forced to disband, and the other members of the carpool team must repeat the whole process of gathering participants and applying for the permit all over again. The carpool permit can also be an expensive option for certain members of the carpool. If a member

of the carpool team drops out, the captain of the carpool team alone bears the burden of paying for the vacant member's portion of the permit's cost unless the team can replace that member.

Georgia Tech's carpool permit also doesn't have any channels in place to ease the communication between would be commuters; Georgia Tech Parking & Transportation Services does not provide a connection between commuters. Instead, it refers their users to Georgia Commute Options to find other commuters. Though Georgia Commute Options is a great service, because they cater to all of Georgia instead of being focused on the Georgia Tech community, there aren't enough users from the Georgia Tech community to make the service consistently reliable for GT commuters. Georgia Commute Options also doesn't have any channels in place that ensure that those that are commuting to Georgia Tech are a part of the Georgia Tech community. They only match carpoolers based on where they live and where they want to go. It lacks any method for users to exchange financial compensation, as well. Uber and Lyft are not great options for carpoolers that want to commute consistently for a long period of time because they can be very expensive options depending on the time of day you choose to ride and what areas you live next to. If you live anywhere near or somewhere that passes an airport, the cost can start around 30 dollars a ride.

3. *Suggestions as to which areas/dimensions of prior work to focus on and/or ignore.*

In our project we want to focus on keeping some of the positive aspects of these services while covering some of the gaps that they left. We would like to focus on maintaining the real time flexibility that Georgia Commute Options and Zimride, but improve upon the flexibility these services offer so that the activities of all of our user groups will be supported. We would also like to focus on facilitating the communication between riders like Zimride, Georgia Commute Options, Uber, and Lyft including the ability. We will work to discover what aspects of the implementation of these services make communication between their users such an easy task. We would also like to focus on keeping costs low just as Zimride was able to accomplish.

f) **Any refinements to your project description**. Describe any refinements to your description in the slides/handouts for P1A (use 1-2 sentences if applicable). Reflect on how this new focus differs from your original project description. You do NOT need to redo P1A, but be sure to put a brief statement at the beginning of the presentation or handout with a brief note of any decisions to pivot directions or narrow-down your focus.

After our presentation of P1A, we got some pointers that we have considered in our reworking of P1A. We were informed about the presence of ZimRide and asked how our goal differs from such a well implemented service, so we took the time to research and find the shortcomings in ZimRide and address those in P1A. In our interview questions, we only planned on asking commuters to elaborate on the negative aspects of their commute, but when asked why we didn't ask them about the things they liked about their commute, we made sure to add those questions to our P1A.

3. A description of the larger social and technical system or context in which your design will operate.

Commuting is a way of traveling to and from work or school on a regular basis. As it is a way of travel, commuting is inseparable from a larger context of local traffic. For instance, one commuter made a comment to our group that he sometimes wait out the rush hour to avoid the congestion. Since our focus is to help the commuters who are looking for an easy way to carpool, basic knowledge on Atlanta traffic will improve our design's efficiency.

In a narrower scope but still within the topic of transportation, our design will affect and be affected by existing Georgia Tech transportation services such as Stinger bus and tech trolley, and parking within the campus. GT transportation services currently offer a free and convenient way of traveling within the campus and to some locations outside the campus ground as well. Taking transportation services into consideration may provide a better understanding of our potential users. Since our users will be using their own vehicles to travel to and from the campus, our design's relation to parking within the campus must also be considered. How will our design affect existing carpool parking permit? How will it affect parking slots?

Outside the scope of transportation, there remains a question of relationship with technical systems. While some form of access to internet will be necessary, necessity of a smartphone is yet to be determined at the current stage of this project. Our design's relationship with its platform will be affected by two different but not mutually exclusive approach to arrange a carpool; pre-arranged well in advance or instantly arranged right on the spot. Pre-arrange approach to carpool does not require an access to a smartphone, but instant-arrange approach most likely will.

4. User Research Report

a) List the user research methods you used and provide rationale for your choice of methods. In other words, why did you choose one method over another? Write no more than one paragraph for each research method chosen. You should have at least three methods presented.

The first user research method we decided to utilize in order to obtain our data for our research project was to conduct an interview. We found that conducting an interview to be an effective method due to 2 main reasons. The first reason being that it allowed us to obtain detailed information specifically concerning personal feelings, their perceptions and opinions which could not be obtained in another way. Additionally, it provided us with the additional option to ask further into questions which we found to be extremely useful because we were able to ask questions normally not acceptable to be placed in a survey due to being overly elaborate.

The second user research method we decided to utilize was to construct a survey. We found the use of a survey to be exceptionally helpful mainly due to being a accessible to a large population. Surveys unlike other user research methods such as interviews and ethnographic observations provide us with advantages including being easy to administer, having low cost in respect to the amount of time it took to make the survey in comparison to the amount of data we were able to receive, and being an unbiased approach providing us with unbiased data.

We decided to exclude ethnographic observation as a method to obtaining user research because we found it to be overly invasive and although it may provide very specific information we may not be able to obtain through other methods. We found it hard to be able to view a participant throughout an entire drive with their consent and if we were to obtain data, the data to be possibly influenced by our presence.

b) Provide details of how those methods were carried out. Specifically, fill out a table detailing the numbers of individuals you observed or interviewed. If you used additional methods, specify the method and how many people were researched using it. See examples in the first row of table A at the end of the document. Note that you are describing user research methods that you applied, but you will describe any data analyses you conducted next.

Target User Group	Number Observed	Number Interviewed	Number Surveyed	Other
Georgia Tech Faculty and Staff	N/A	4		
Georgia Tech Professors	N/A	1		
Georgia Tech Students	N/A	8		
Georgia Tech Parking and Transportation Services	N/A	1		
Georgia Tech Community	N/A	N/A	96	We posted a short survey that would gather information from faculty, students, and staff that have to commute to work in the morning. The interview obtained general demographic information as well as the overall opinions on carpooling. If the participants had experience with carpool, they were asked about their carpooling experiences.

c) Include any instruments you used in your research (e.g., surveys/questionnaires, interview questions) as appendices.

The survey and interviews that were conducted for our research are included the appendix.

d) Other forms of input that informed our understanding of the problem space.

- **Personal Experience** - In our group, three out of four currently commute and one did in the past.
- **GTPTS** - We contacted GT Parking and Transportation and asked for their opinion on carpooling and carpool services GT has used in the past.
- **Reddit** - Several people commented on their personal experiences in the past with commuting, both the pros and cons.
- **Social Media** - Many people express their opinions on commuting and their frustrations with carpooling.

5. Analysis of user research data

a) Summarize the data analysis activities you performed. State how you went about analyzing your user research data. For each data analysis approach, state the rationale for using it.

Data Collection Method	Data review and analysis approach	Rationale for approach
Survey posted on GT reddit, CS 3750 piazza and distributed through personal relationships Closed-format questions asked about: - Status in GT(student, faculty, staff) - Numeric data(cost, time) Open-format questions asked about: - Attitudes(e.g.sharing a ride with a stranger)	Data from open-format questions were used 1. As a guideline when interpreting qualitative data collected through interviews and organizing them into an affinity diagram 2. And provided specific reasons to why certain users hold certain attitudes Geographical data (where commuters commute from) was translated into graphical data through Google Maps	Survey data provided a general idea of our user groups, but qualitative data collected from the interviews provided much deeper insight.
Interview with students and faculty in GT community	Transcribed each audio recording of the interviews into text format Pulled direct quotes or ideas from the transcribed interviews and collected them in an affinity diagram	Affinity diagram allowed us to collect qualitative data from different interviewees in different words and turn them into a few concrete ideas

As stated in the rationale for approach in the table above, survey data was used mostly as a guideline for analyzing qualitative data from the interviews. Additionally, the survey also contained questions not included in our interviews that were integral to our understanding of the user groups. For example, survey participants were asked where they commute from. Cities and towns from the participants' answers were pinned to Google Map.(See Appendix C) Even within our small sample of 98 responses in respect to the entire community of commuters, there is a noticeable spread in neighborhoods which participants commute from. The spread indicates that our user group commutes to the campus from all over the Atlanta metropolitan area. In order to ensure that every user of our design has no trouble finding people from their neighborhood to carpool with, our design must obtain and maintain a large user population.

While the spread of GT commuters' neighborhoods was unique knowledge that was only available through our survey, most findings from our survey were consistent with the findings from the affinity diagram.(See Appendix D) To briefly summarize the affinity diagrams, we reduced down about 50 affinity notes from several interviews with commuters into 5 central ideas in forms of personal statements, as listed below:

1. ***I want to be able to control who I ride with.*** In both our surveys and interviews, many participants showed great interest and some concerns regarding their potential carpool partners and the nature of social interaction that takes place between them. To share a ride is to share a small space inside a vehicle with possibly a total stranger for however long the commute takes. Participants of our research demonstrated a clear demand for an ability to choose exactly what type of person they share that social experience with.

2. ***I want to always arrive at my destination on time without unnecessary delay.*** Timeliness is an important matter to commuters who are already losing their valuable time on the road. Conflicting schedules and punctuality of carpool members can cause a significant delay to a user's commute. Responses from both research methods suggest that commuters who are interested in carpooling are hesitant to arrange one because of the delay carpooling may cause.

3. ***I want my commute to be as safe as possible.*** Participants also raised a concern for safety in ridesharing. One interviewee suggested a measure to verify a Georgia Tech membership as a possible implementation.

4. ***I want to maintain my independence when commuting.*** Some participants stated their strong preference for independence in both their commuting schedule and privacy in vehicle. It is yet to be discussed whether we will strive to find a solution to encourage commuters who value their freedom to take interest in our design.

5. ***I want to help the environment.*** There were a few who expressed their interest in reducing the environmental impact of automobiles. Our team views the reduction of environmental impact as an important benefit of carpooling and was delighted to see that we were not alone. Apparent interest in the environment within the responses not only delighted us but also suggested that the positive effect of ridesharing to the environment may truly act as a secondary motive that further encourages commuters to be interested in our design.

6. User Personas

Persona 1

Emily
Student at GA Tech
Location: Atlanta, GA
Age: 22

About Emily

Emily is a third-year at Georgia Tech majoring in Industrial Engineering. During her first year on campus, she dormed on West Campus with one other roommate and had no negative experiences. Her second year, she lived on-campus as well at 8th Street Apartments on West Campus. However, she decided to commute during her third year because she wanted to spend more time at home and with her family and friends. She now spends about 2 to 3 hours on her commute from Suwanee everyday and is interested in carpooling as a way to not only save money and time by taking the HOV lane, but also as a way to meet new people while benefiting the environment.

Behavior Considerations

- Although Emily is extraverted, she is in the small percentage of students and her friend group who commute. She sees carpooling as a way to meet new people.
- Commuting has taught her valuable time-management skills that she uses in her daily life, but she is worried that carpooling might affect her schedule.

Frustrations

- Emily knows that if she were to carpool, she would be able to utilize the HOV lane and possibly save some time.
- Because she does not own a peach pass, she sees carpooling with someone who has one as a benefit.
- Because her schedule varies everyday, she worries that not having a set schedule might prevent her from sticking to a carpool schedule that involves other people.

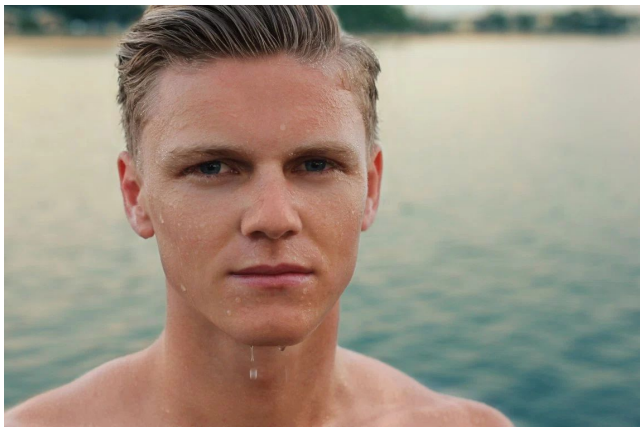
Goals

- Emily hopes to save some money by splitting the cost of driving.
- Other than the commute itself, Emily enjoys the freedom of living off campus. and so, she is looking for options to make it more efficient and manageable.

Tasks

- Emily hopes to maximize her study time, which is one reason why she drives alone, so she does not need to adjust to anyone’s schedule.

Persona 2



Geoffrey
Student at GT Tech
Location: Atlanta, GA
Age: 21

About Geoffrey

Geoffrey is a fourth-year student at Georgia Tech who is double majoring in Physics and Applied Mathematics. He is originally from Georgia and and is expected to graduate this spring. His freshman year he lived on east campus in the Howell dorm as a member of the Georgia Tech's Grand Challenges Program - a program which allowed him to work on solving real world problems with other program members. For the next two years Geoffrey decided to live in Center Street East on West campus with three other friends he met in Grand Challenges. For his final year at Tech he decided to commute from his home in Marietta, Georgia due to family financial issues. Outside of school, Geoffrey is extremely passionate about preserving the environment.

Behavior Considerations

Geoffrey is an incredibly introverted individual. While he doesn't have any significant social problems, he has a propensity to become annoyed with individuals upon interacting with them for extended periods of time. During his first year at Georgia Tech, he experienced an altercation with his roommate due to his roommate's lack of respect for previously agreed upon boundaries. So when it comes to his commute, he prefers for his commute to be quiet and peaceful. And he doesn't mind others riding in his car, so long as they treat his vehicle with respect. Additionally, he has very limited involvement with organizations on campus and only occasionally goes to chess club. So he likes to leave campus as soon as his last class has completed. Although Geoffrey has a general tendency to have conflicts with individuals as he is not the most affable individual, carpooling is a viable option for him because there is no obligation for riders to interact with each other.

Frustrations

Geoffrey does not like using specific rideshare services such as Uber because of their high costs. Additionally, Geoffrey finds it quite annoying whenever he gives an individual a ride somewhere without receiving anything in return. Riding the Marta is a last resort option for Geoffrey as he finds the cleanliness standards of the Marta to be absolutely awful. Geoffrey also gets annoyed by Marta in the sense that it consistently takes more time than commuting via car. Carpooling is an ideal option for Geoffrey because it will ensure that he will be able receive a ride in return for his services. Moreover, carpooling will be a good option for him since it will be a vastly cheaper option than Uber. Lastly, Geoffrey will also vastly prefer carpooling to Marta as it will be cleaner.

Goals

Geoffrey's primary goal for carpooling is to save money as his family is experiencing significant financial issues. Because this solution should reduce his commuting costs, Geoffrey should be an ideal candidate for carpooling. Additionally, Geoffrey is also looking to reduce his carbon footprint. Because carpooling reduces carbon output, Geoffrey is looking to start carpooling more frequently. Furthermore, Geoffrey is looking to save more time this year. If Geoffrey starts carpooling as opposed to taking the Marta he believes he will save roughly an hour every week.

Tasks

Geoffrey lives in Marietta, Georgia and is required to commute back and forth to Georgia Tech. He has to arrive at Georgia Tech before 10:00 AM (first class) and needs to be home before 8:00 PM every evening. Because carpooling affords flexibility with respect to drivers and schedules this will make it an ideal solution for him.

7. Research Implications

We initially thought that with the majority of our group members currently commuting or having commuted before, we would have a clear understanding of both our user groups and the problems that they face. However, after having conducted user research, we were able to grasp truly how limited our view and understanding of this problem area was. Our main "take-away" thus far has been identifying specific areas where we should primarily place our focus on as well as having a better understanding of our user groups and the general problems they face.

We found that, as we had initially thought, the main concern experienced by those who currently commute is the annoyance of traffic and the amount of time it takes to commute due to limitations such as not being able to use the HOV lane. However, contrary to our initial beliefs, we found that rather than having our target users consist almost entirely of those who have a car and commute to school by themselves, that instead that specific user group only consisted of slightly more than half of our 4 different types of predicted users. This heightened our awareness of the other methods in which people decide to commute. Had we only focused on commuters that drive themselves to and from campus, we would have made light of the problems experienced by a large group of our target users.

Furthermore, we were able to further our knowledge in regards to the magnitude of the problem, the types of target users, as well as the target user's feelings concerning the idea of carpooling with others. We found that the majority of our target user groups' daily commute consists of more than 30 minutes, users on average pay more than $750 for parking per year, users have at least 2 unused seats during their daily commute even if they already carpool, and we also found what users find to be most uncomfortable when finding new carpool members. From this information, we believe we have a solid foundation of the our problem space, and understand the initial steps we should take in establishing an improved alternative to the current methods of commuting to and from school.

APPENDIX

Appendix A

Central Interview Questions

1) Can you walk me through your morning commute?(Follow-up: Regular? Mode of transportation?)
2) What frustrates you the most about your commute? (Follow-up:Can it be solved through carpooling?)
3) If you don't carpool, what stops you from doing so? (phrase accordingly. If the interviewee has previous experience carpooling, what stopped them from continuing? If they don't, what stopped them from starting?)
4) (If you either carpool or have tried to) What problems did you face? For example, finding people to carpool with?
5) What are incentives you would want to obtain through carpooling.

Appendix B

Interview with GT Parking and Transportation Service Campus Transportation Manager, Lisa Safstrom.

1. Some info on the number of parking slots, parking permits, carpool permits, the number of commuters (general information regarding parking and transportation on GT campus, including commuting)

2. Experience with Zimride. How did it start? Positives and negatives. Why the partnership stopped.

3. Experience with Georgia Commute Options. Not a partnership, more of redirect.

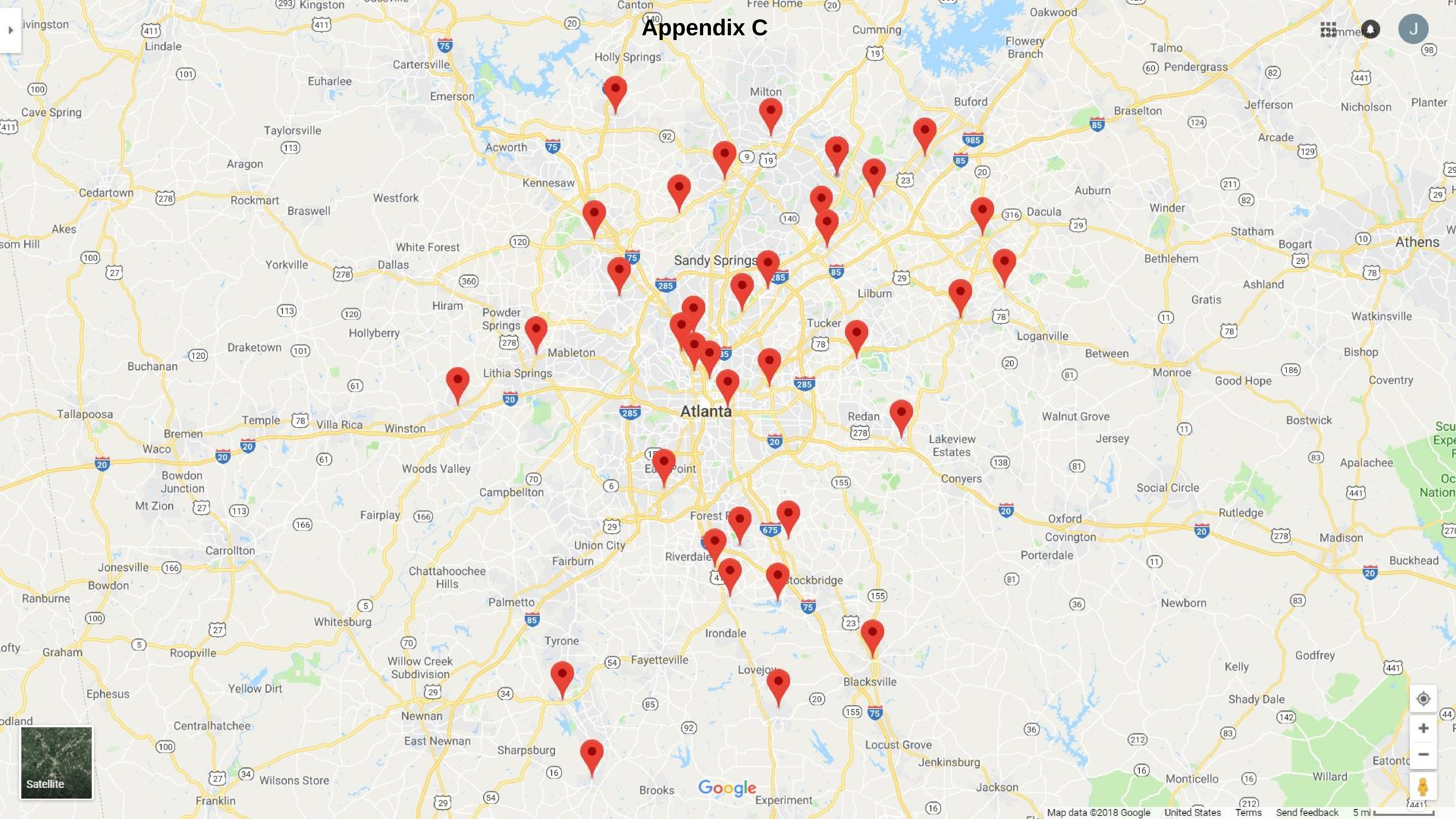
4. On-campus app development? What are you looking for? What would you want in the eventual app as features?

5. Carpool permit. Inflexibility. How to address that with eventual rideshare services?

6. Do you commute yourself? If so, could you take me through your morning commute routine?

7. What do you like the most about your commute? What frustrates you the most?

Appendix C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Canton
Free Home
Livingston
Oakwood
Lindale
Cumming
Holly Springs
Flowery Branch
Talmo
Cartersville
Pendergrass
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Emerson
Buford
Jefferson
Nicholson
Planter
Cave Spring
Braselton
Taylorsville
Acworth
Arcade
Aragon
Kennesaw
Auburn
Cedartown
Rockmart
Westfork
Winder
Braswell
Dacula
Akes
Statham
Athens
White Forest
Bogart
Yorkville
Dallas
Sandy Springs
Bethlehem
Lilburn
Ashland
Hiram
Powder Springs
Gratis
Hollyberry
Tucker
Watkinsville
Draketown
Mableton
Loganville
Buchanan
Between
Bishop
Lithia Springs
Monroe
Good Hope
Coventry
Tallapoosa
Atlanta
Redan
Walnut Grove
Bostwick
Temple
Villa Rica
Winston
Bremen
Lakeview Estates
Jersey
Waco
Woods Valley
Apalachee
Bowdon Junction
Conyers
Campbellton
Mt Zion
Social Circle
Fairplay
Forest Park
Oxford
Rutledge
Covington
Carrollton
Union City
Riverdale
Madison
Jonesville
Fairburn
Stockbridge
Porterdale
Buckhead
Bowdon
Chattahoochee Hills
Ranburne
Palmetto
Newborn
Whitesburg
Irondale
Tyrone
Graham
Roopville
Willow Creek Subdivision
Fayetteville
Godfrey
Lovejoy
Kelly
Blacksville
Ephesus
Yellow Dirt
Shady Dale
Newnan
Centralhatchee
East Newnan
Sharpsburg
Locust Grove
Jenkinsburg
Eatonton
Willard
Monticello
Wilsons Store
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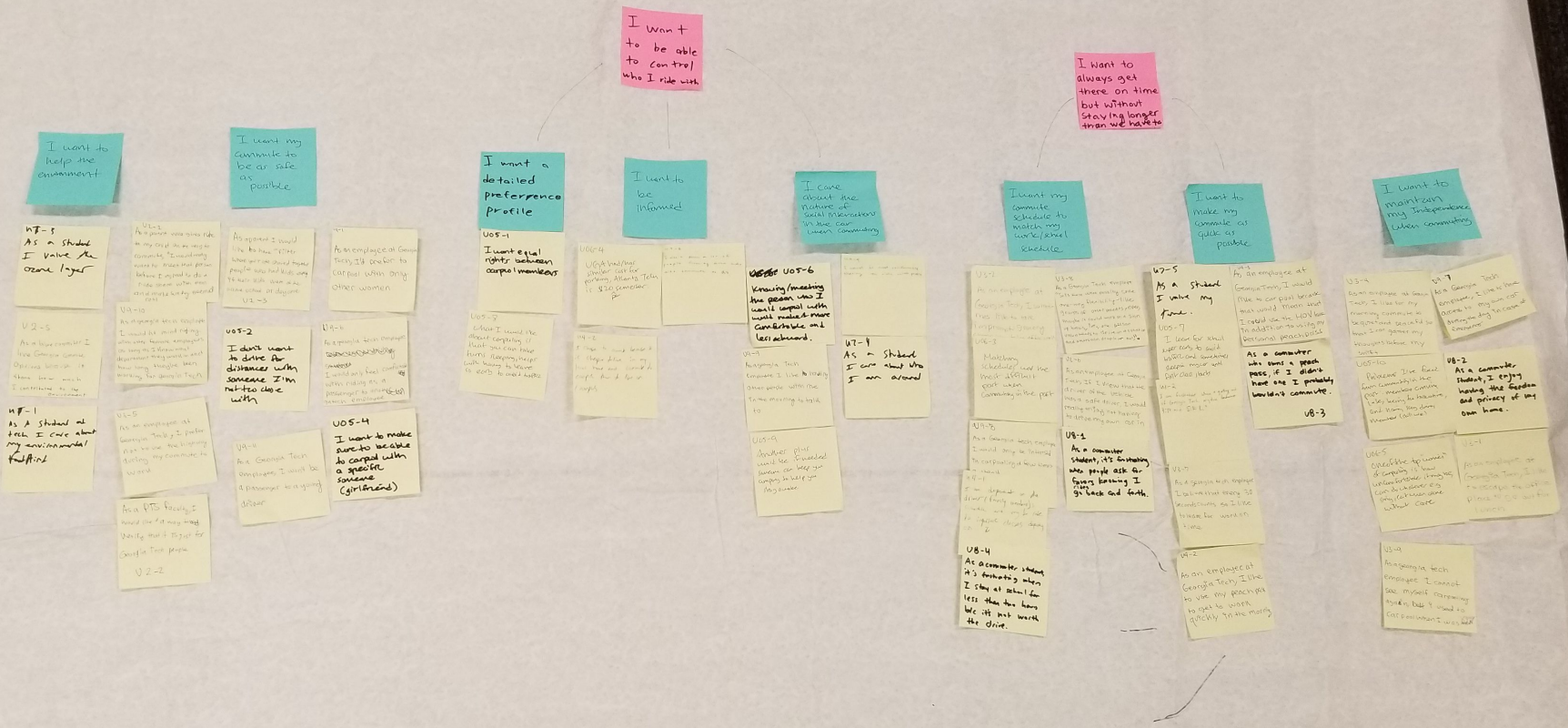
Appendix D


I want to be able to control who I ride with.
I want to help the environment.
I want my commute to be as safe as possible.
I want a detailed preference profile
I want to be informed
I care about the nature of social interactions in the car I am commuting
I want to always get there on time but without staying longer than what has to
I want my commute schedule to match my work/school schedule
I want to make my commute as quick as possible
I want to maintain my independence when commuting