General Advice:

* Introduce yourself at the beginning
* Introduce the title of the presentation
* Don’t read your notes if possible
* Don’t speak too fast
* Put an emphasis on what you’re saying, so you don’t sound like monotonous
* Look at your adviser once in a while for possible signs
* Stand on the right of the white screen if you are right-handed so you can easily refer to the slide without giving your back to the committee
* Face the audience when you talk
* Keep an eye contact
* Make sure to keep attention to the reactions of the committee and don’t forget to react in turn

Script :

|  |  |
| --- | --- |
| Slide 1 : (Title page)   * Thank you for being present today .. * I am very happy and excited to be presenting to you my work today and thank you for your presence * represents a student’s collective understanding of his or her program and major * As a presentation opener I would like to start by saying that this year has been extremely important to me as it is defining my career and showed me what I am really passionate about. * This particular year has been very important in my career * If you don’t know me I will present myself in under 20 seconds, my name is Ayman Mahmoud I am doing my first * If you don’t do what scares you the most how will you know what you’re capable of doing | Time:  2 min  Notes:  If any part along the presentation lack details or you want to hear a further explanation, please don’t hesitate to ask me and I will provide more information. |
| Slide 2 : (Overview)   * The overview is going to be as follows |  |
| Slide 3 : (Introduction)   * This presentation is to show my research work for this year * Present my research work during this year 2019/2020 * The importance is twofold with.. * especially because we're going to witness an increase of +42% in passenger mobility and +60% in freight transport by 2050 * Many suburban and rural areas are not adequately served as they lack the population density to justify public transit, i.e., the public transit is not economically viable * As seamless as possible with common information, an integrated ticket and a multimodal station where passengers feel safe, secure and comfortable. * To start I have set some objectives that can drive me along the year … these objectives are. |  |
| Slide 4: (Key Figures & history)   * It is no secret that we need an effective solution. * Ground transportation still represents 15–20% of total GHG emissions in the European Union and in the US. Hence, despite a comprehensive toolbox of innovations and alternative services * Congestion has increased by 15–20% (according to the TomTom Index between 2008 and 2018) * Flinc and berkloning in Germany, via transport that has a great presence in US and Europe * Companies actually operate on this basis but none of them is contributing significantly to the track congestion problem * Which makes you question their contribution * I then found out that berlkoenig is operated by Via |  |
| Slide 4: (History)   * Shared mobility concept existed before even the colored television was invented. * when a housing cooperative began a small car share arrangement, it was called “Sefage program”. * In this period this solution wasn't very attractive. Simply because the automotive production got faster and cheaper and it was more appealing to own your vehicle than to share one. |  |
| Slide 5: (a point of critique)   * That lead us to start the topic by a point of critique * However, what we're experiencing now is that, although the solutions exist * Which can be because of that supply doesn’t meet the rise of demand * Shared mobility is part of the problem? * There exists no effective method of integrating ride-sharing solutions into transport trip planners. as of now, mainly due to the fuzzy and flexible nature (e.g., no fixed stops, possibility of making detours) of carpooling. Some solutions are proposed. * Which shows that the shared mobility can be highly criticized, the studies made in new York show that…The numbers of fleet sizing optimization are very promising, without shared mobility almost half of the taxies in Manhattan are empty at normal times, the article in Nature magazine, written by researchers in Senseable city lab(8), shows that we only need 60% of today's taxis. Additionally with autonomous shared mobility, the perfect scenario, we can move all Manhattan with 137,000 vehicles which is half of what's on the road today (8). * 13,587 yellow taxi cab |  |
| Slide 6 : (Motivation)   * Now that you have been introduced to the history and some interesting numbers * Interest of ride sharing and create a seamless intermodal trip for travelers by the EU * Many researchers had already investigated this topic. And there is a strong research force in that direction * In the present context, the passenger intermodal trips, which combine at least two modes of transport in the same trip; for example public transport + the private car ; public transport + public transport etc., are * There is a research gap when it comes to linking on demand mobility with the first and last mile problem and areas underserved with public transport. * The number of dynamic ride sharing relevant for a query increases when allowing routes which bring a passenger to a station where he can use public transport to continue his journey, this is because the passenger will be able to cover a longer distance paying less money, also gaining time because there is a reliable mobility service that will get him to the station of the public transport. |  |
| Slide 7 : (Hypothesis)   * There is always room for improvement * The very first thing I did is think about my own experience with transportation * Here are my first two points: * People find it hard to manage their itineraries and more importantly their time * The planning gets harder with the number of transportation modes you are going to take * I personally find it hard to know exactly when I should leave my house * Once I established that the problem exists it was time to look into the state of the art into that matter and dive into literature review * Mode 1: extra careful 10-20 of contingency. * Mode 2: wing it and catch the next train. | Notes:  Remember that you’re not solving a planner  Yuval Noah Harrari quote |
| Slide 8 : (Methodology in research)   * The key contributions are the following * The bootloader () * Mention your method of registering information * In the next slides I am going to mention the most important findings in the state of the art |  |
| Slide 10 : (State of the art) (shared mobility)   * Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, * The literature review had to be segmented into two parts * A survey of dial-a-ride problems by Ho et al. (9) presented an up-to-date review of recent studies on dial-a-ride problems (DARPs) with their different variants and solution methodologies. * Many approaches are adopted to solve the dial a ride problem, each with a specific design that makes each problem different than the other. * However, some solutions take in to consideration the social welfare and the balance of affecting ride to drivers which makes the optimization relative to the context. * S´aez et al. (2008) present a hybrid adaptive predictive control approach based on a genetic algorithm where the demand pattern is obtained by a zoning method based on a fuzzy clustering model. * . Schilde et al. (2011) investigate the potential of using stochastic information about future return trips for the dynamic stochastic DARP applying two SSAs: a DSVNS and a MSA algorithm * Using re-optimization and an efficient network mixed-integer optimization formulation along with simple heuristics in (24), they were able to find solutions for large scale problems with 5000 taxis and 26,000 bookings. * Talk about taxonomy |  |
| Slide 12: (Intermodality)   * Inter-modality, also called mixed-mode commuting, involves using two or more modes of transportation in a journey. However, the research that is going to be displayed in the next paragraph doesn't tackle the the optimization of mobility on demand with public transport, it does mention studies that mix ride-sharing with public transport nevertheless from routing problems point of view and feasibility studies. * One of the early notable investigation done in this area is the report “Ride-sharing as a Complement to Transit”(28), this report was published in TRB, highlights ride-sharing as an important opportunity for transportation agencies to address the “last mile problem” * The report also shows that despite these important reasons for integrating ride-sharing into transit services, only a modest number of public transit agencies is involved in ride-sharing. * Notable research in this part is found in (4) where they investigated the possibility of realizing a seamless integration of ride-sharing and public transit as it may offer fast, reliable, and affordable transfer to and from transit stations in suburban areas thereby enhancing mobility of residents, they investigated the potential benefits of such a system by means of an extensive computational study. * Other researchers contributed by studying the same public transport feeding challenge but with autonomous mobility on demand in highly dense cities not rural areas, they presented a network flow optimization model that captures the joint operations of autonomous mobility on demand systems and public transit (30), * Notable contribution in (10) where they worked on combining dynamic ride sharing and public transport. In their work they address two problems in multimodality; the first is to connect public transport stations by dynamic ridesharing and the second is connecting start and destination of a query to public station routes by dynamic ride-sharing routes, although their contribution to the subject is more on the route planning the paper proposes very good methods for ride-matching and finding connections, they also showed better connections using ride-sharing and two modes of transport in terms of travel duration and cost. |  |
| Slide 14: (shared mobility and intermodality)   * To conclude this point in one sentence we can say that Inter-modality and multimodality exist in literature but none of the literature mixes between dial a ride problems and multimodal transport although it exists in real life. * Each service has a specific context, there's a clear lack of research output in DARP optimization problems when it comes to intermodal trip planning. * Even in the world of autonomous mobility their results show that an autonomous mobility on demand systems can significantly reduce travel times, pollutant emissions, total number of cars, and overall costs compared to an autonomous mobility on demand system operating in isolation, |  |
| Slide 15: (Conclusion state of the art)   * As previously mentioned, no study captures the interplay between multiple externalities arising from the synchronization of different modes of transportation. * To date, there exist no optimization frameworks that capture optimal coordination policies for MoD systems whilst assessing their achievable performance (30). * We can safely establish that the maturity of this subject is stagnant, this means that the topic is on the table now for a significant amount of time but the improvements and contributions don't seem to serve the area of first and last mile problems when using public transportation. * One of the common integration options between a fixed-schedule system and an on-demand feeder systems the so-called Demand Responsive Connector (DRC) (4). * Although a research gap has been identified, and despite the fact that in (9) they recommended a unified method for solving different DARP variants. Each DAR system has problem-specific constraints due to its underlying motivating application. * My hypothesis developed * Although some of these apps will allow you to book your ride that will get you to the train station, neither the app nor the mobility on demand service provider will be responsible if you arrived late for the train. |  |
| Now that the problem has been identified – I invite you in the next slides to look at the problem formulation , definition solution approach and results | |
| Slide 16: (problem definition)   * The dial a ride problem often receives the pick up and drop-off time windows as inputs from the users. * For mobility on demand the pick up location is usually the nearest point to the customer. * In this problem we're going to introduce dynamic pick up locations taking into consideration. * The drop-o time windows which we're going to represent in our framework as timeslots and fair walking distance between customers and respective pickup stations. |  |
| Slide 20: Mathematical formulation   * The problem formulation is going to be presented in two mathematical models for the sake of simplicity and clarity; the first is going to handle the first part which is the station allocation problem and the second formulation for the driver allocation problem. * In this DAR problem the drop-off time window is defined by the timetable of the destination and not by the user, which makes the whole experience more reliable and seamless. * The modelling was based on Cordeau & Laporte Three Index Model and mathematical modelling was in general from H. Paul Williams book, model building in mathematical programming |  |
| Slide 22: (Structure & flow)   * This structure helps me build the framework as I can focus on improving each part separately |  |
| Slide 28: (Results and observation)   * The data shows that there is a way to make the passengers wait less using darp with time windows in favor of minimizing the wait time. * Highlight the meaning of the results in relation to my studies and this current year * Talk about making actual comparative studies * In this set of data the total distance walke by the bookings is 36:715km, by comparing it to the total distance by vehicles 323:96km, the walking distance covers around 11% of the total travel distance. * The work on parsing instances would take more time than working on the model itself |  |
| Slide 29: (the contribution of the project)   * The state of the art a bibliographic research * I presented a case studies analyzing shared mobility system performances or studying their potential impacts on people's lives and their daily commutes if we optimized the DARP to feed the public transport system. * Thanks to this rich bibliography I am now able to identify the relevancy of scientic papers on a much higher pace. * Programming Skills * In the state of the art section I showed the connection in literature between public transport and shared mobility * I showed how can the DAR problem be reformulated to answer to the gap that currently exists * I gained confidence & motivation to continue in this research. * In the second part of the process, I learned a lot * With the latest trends to research deploying new autonomous mobility services, inter-modality become more attractive. And there is also a need to introduce new models and algorithms. |  |
| Slide 30: (next steps)   * With the latest trends to research deploying new autonomous mobility services, inter-modality become more attractive. * And there is also a need to introduce new models and algorithms. |  |
| We can find an example of DRCs in several US cities  Also mention companies that create a connection from a station to their hq Several local authorities are setting up dial-a-ride services or are overhauling existing systems in response to increasing demand such as BVG BerlKonig (33), and Flinc ride-sharing (34), to better describe the problem is illustrated in ( fig.2) in section (6.1). |  |
| Use mobility on demand as a feeder system to public transport.  Ride matching problem, to create a seamless connection between timetables in public transport & booking in MOD.  Use data from previous bookings to build an better optimized pick-up and drop-off nodes. |  |
| The idea consists of designing a set of minimum cost vehicle routes satisfying capacity, duration, time window, pairing, precedence and ride time constraints in the context of feeding a public transport system. |  |
| We can now state that in this context the problem represented is twofold and follows a heuristic approach. |  |
| Slide 10: (Methodology)  What came most useful in the start is the survey on model and algorithms in shared mobility (12). That was a comprehensive survey to the most recent variants of the shared mobility problems. Including a study of their different features and modelling approaches. Not only that but the survey also explained all the constraints researchers consider into their shared mobility problems such as Time Constraints and Capacity Constraints, the relationship between transporting goods and people, pickup and delivery problems and the potential merge between both worlds. |  |
| * Already in 1985 the Madrid Regional Transport Authority (MRTA) made a very clear definition of what an interchange should be: “Area whose purpose is to minimize the inevitable sensation of having to change from one mode of transportation to another.” |  |

The literature review goes beyond this report. In (15) I built an online bibliography that is up-to-date with the latest research in this subject. And also other topics such as traffic congestion forecasting and the use of data in optimizing transportation, in addition to that you can also find an excel sheet that sorts down all the articles reviewed and their importance, authors, publishing journal, year and more detailed description such as the use of time constraints in VRPs.

A train station is a station where a train stops.

- Then, tell me, what is a workstation?

A very interesting presentation of the terminology used in shared mobility

can be found in(31) (12) (32).

I took the most relevant terms and tried to develop them to them the explanation in the context of my project such as:

* Going deep in constraints, the difference between a soft and hard constraint
* Explicit and implicit time windows
* Time extended and expanded
* Pre-arranged vs real time bookings

1. Questions I might be asked and their answers:
2. Plan ancient:
   1. Choix de sujet & motivation
   2. Chiffres clés
   3. Hypothèse
   4. État de l’art & méthodologie (recherche bibliographique)
   5. Définition du problème
   6. Formulations mathématique
   7. Résultats
   8. Étapes suivante
   9. Accès au projet

Should I mention Algorithm?

* Don’t forget to mention that colour intensity reflects the number of bookings in that station

Don’t forget to send an email with the links