**Advanced Data Structures Project - Problem Statement**

**Guidelines for Problem statement definition**

* Formulate a problem statement
* Check for its feasibility through literature reviews
* Justify the benefits of the project
* The proposed solution should address a problem through appropriate data structures

**Format of the problem statement document**

* Write an abstract of the proposed project to emphasis the usage of appropriate data structures.
* Describe the domain / application chosen for project work.
* Describe the input data.

The origin and destination locations

The choice/s of transport mode for the trip

The time of departure or time of arrival

Once the information above has been obtained from the user, the trip planner requires access to a number of data sources from back-end databases in order to calculate an optimal trip for the user. These include:

The two graph networks are similar in the respect that they consist of a set of nodes and arcs that connect neighbouring nodes together; however, they are different both from a conceptual point of view and for practical implementation purposes. The nodes and arcs within the road network represent physical entities that are geographically separated, while the nodes and arcs within the public transport network represent temporal events and the possible connections allowed between these events.

Road network as a graph data structure This consists of two groups of data that relate to each other: intersection data and road data. Intersection data include latitude and longitude coordinates and turning restriction information, such as no-right-turn, no-left-turn or permitted U-turn. Road data includes the name or description of the road, the identifiers of the start and end intersections for the road (which can be used to indicate direction), and data that can be used to calculate the travel time along the road. This can be either the length of the road plus the speed limit or the measured free-flow speed along the road, which can be used to calculate the travel time, or alternatively, real-time and historical travel time data, which can be used to provide a predicted, time-dependent travel time along the link

* Explain how the data would be stored/accessed/updated in your project
* Give your choice of suitable data structures with justification.

1. The factors to be included in calculating the budget can be customized. For example, in addition to already mentioned costs, other costs like international calling card’s cost, Airport pick and drop taxi cost etc. can be added.
2. Once the user decides upon the trip to go for, the user will be presented an option to book flight tickets directly from the application.
3. The application can act as single solution to cater to all needs of the trip like booking the taxi for pick and drop, buying calling cards, booking the hotel, Visa information, weather details etc.
4. Feedback about the trip can be taken after the trip from the user which can be shown to future users for their ready reference.

The introduction and high usage of mobile devices in the last decade has encouraged the development of applications to assist travellers in the planning and completion of their journeys, and providing them with directions to get them to their destination as quickly as possible. However, the majority of these journey planners focus on generating trips that utilise either public transport or private vehicle for the entirety of the journey, but not both together.

The method proposed for searching through these two different networks allows for the tailoring of search algorithms to the specific networks, as well as minimising the overall search space and the visits to a node as much as possible.

The most important component of the IMTP is the data that is used to compute trips for users. There are a number of different data sources that can be used, and these are categorised into two groups: mandatory data that is required for the basic functionality of the trip planner, and optional data that is useful for providing extra functionality to the user.

Service link – This arc connects arrival and departure events, and represents either the transit vehicle moving from one stop to the next stop, or the vehicle sitting stationary at the stop between its arrival and departure events. • Transfer link – This arc connects arrival events to transfer events, and represents the ability for a passenger to disembark from the transit vehicle to either transfer to another service, or to complete their public transport journey. Additionally, the transfer link can connect an arrival event in one stop to a transfer event in another stop, which represents the passenger disembarking from the transit vehicle and walking to a nearby stop to board another service. • Boarding link – This arc connects transfer events to departure events, and represent the ability for a passenger to board a transit vehicle. • Waiting link – This arc connects consecutive transfer events within a stop, and represents the waiting time that a passenger spends until their chosen service arrives for boarding.