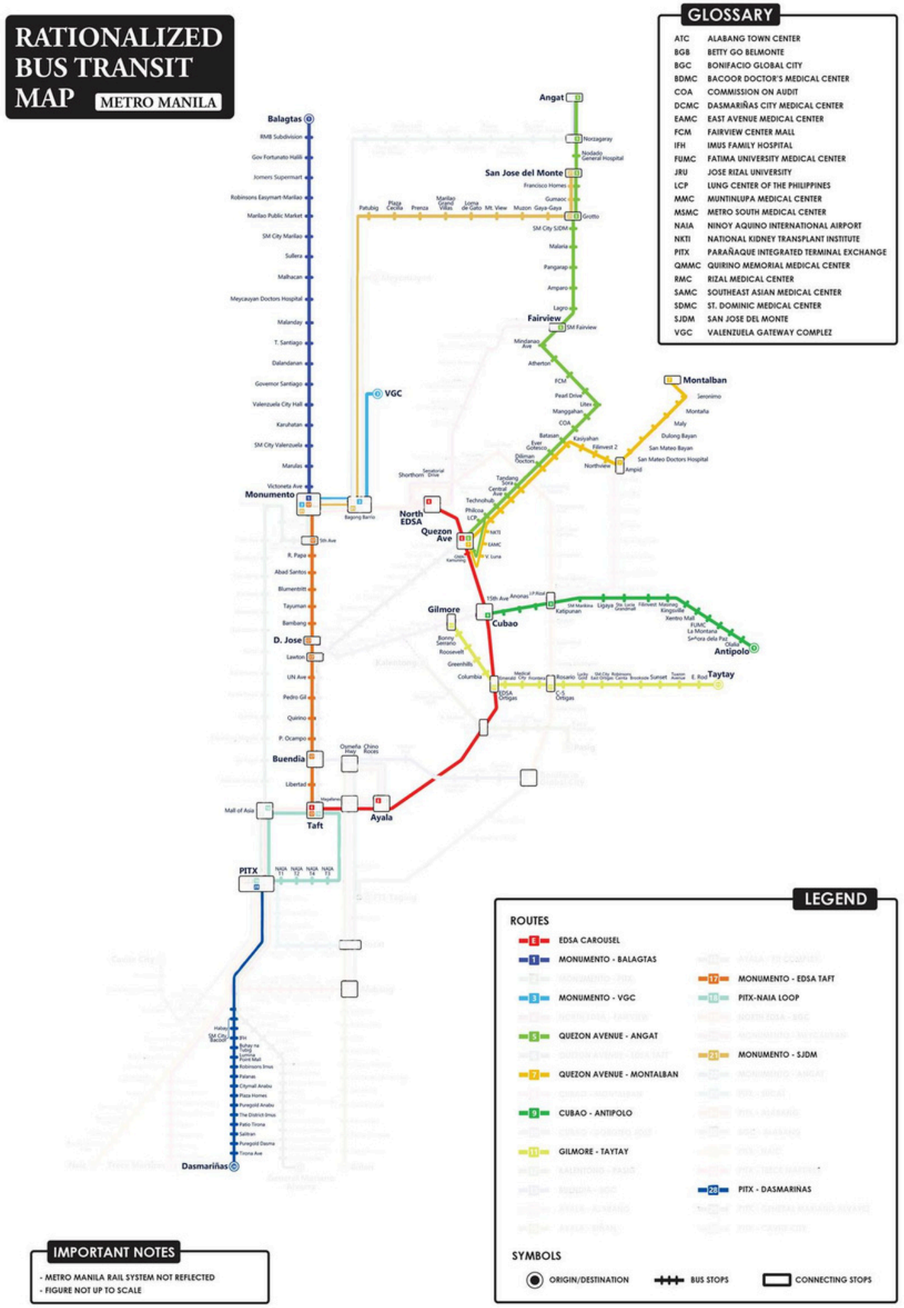
F.A.S.T: Framework for Algorithmic Systematic Transportation

Enhancing Transportation Efficiency Through Computational Optimization

Problem:

- Organizing public transport systems that pass through Quezon City is crucial in fostering a commuter-friendly experience, which can have great ramifications in solving traffic congestion in the city's roads.
- Notable roads and highways that pass through Quezon City include Commonwealth Avenue, EDSA, and Aurora boulevard.



Train Routes

Iteration 1

Problem Identification

- 5 Bus Transit Routes running through Quezon City
- 2 Railway Transit Lines

Decomposition

- Identify all bus stops for each bus transit route
- Identify all stations for each railway transit line
- Determine connections between bus routes and/or train lines to identify transfer points

Pattern Recognition

- Bus stops within a bus route are more frequent than train stations within a train line
- Some bus routes have similar paths to train lines
- Some train stations are near to bus stops, so transfer points may be present here

Abstraction

- Determining the starting point and destination point
- Determining what bus stops or stations are within reach of your starting point

Iteration 2

Problem Identification

Finding the most favorable route and determining fare between designated points. The favorable route can either:

- use bus routes only
- use train lines only
- use both bus routes and train lines

Decomposition

- Identify all possible routes between starting and destination points
- determine which routes require transfers between buses and/or trains
- calculate travel time for each route

Iteration 2

Pattern Recognition

- more stops = longer travel time
- some routes have faster travel time, despite more stops

Abstraction

- classifying routes based on whether they use bus only, train only, or both
- determine travel time

Iteration 3

Problem Identification

Developing the algorithm to find:

- fastest path

Decomposition

Interpret the bimodal transit system as a graph, where:

- nodes = bus stops/train stations
- edges = connections/transfer points
- weights = travel time and fare cost

Implement graph search algorithms to determine shortest path in terms of time or cost

Implement graph search algorithms by weighted scoring for a route that is as fast and as cheap as possible

Iteration 3

Pattern Recognition

- fastest route may cost more
- cheapest route may take longer
- balanced route is both efficient and cost-effective

Abstraction

- represent the bimodal transit network as a graph
- let the user decide if it prefers the:
- the fastest path
- Use traversal techniques to generate a route based in user preference