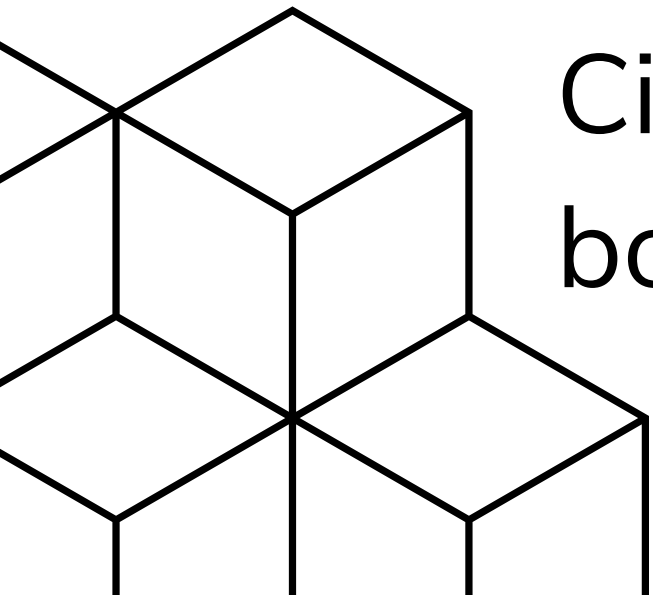
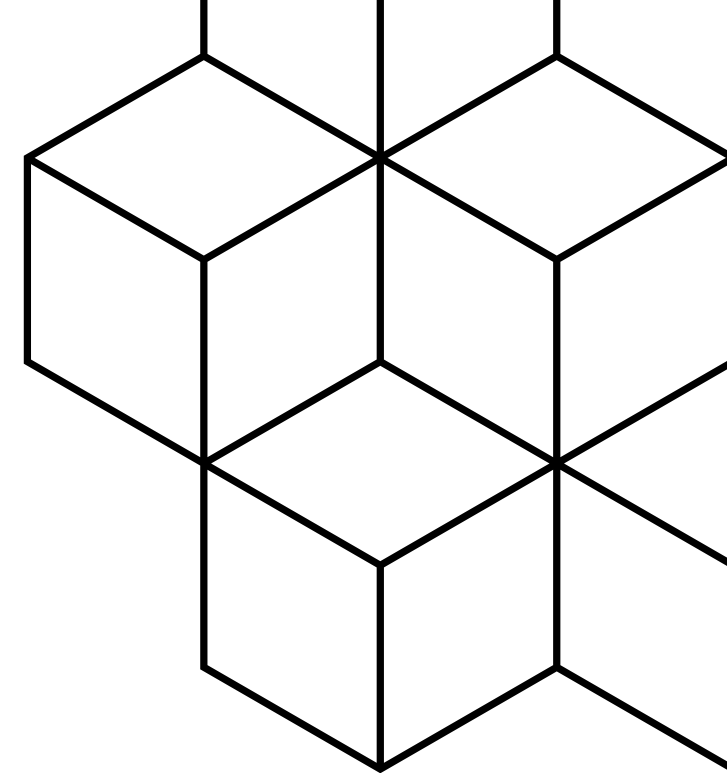


# F.A.S.T: Framework for Algorithmic Systematic Transportation

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.



RATIONALIZED  
BUS TRANSIT  
MAP

METRO MANILA

IMPORTANT NOTES

- METRO MANILA RAIL SYSTEM NOT REFLECTED
- FIGURE NOT UP TO SCALE

GLOSSARY

ATC	ALABANG TOWN CENTER
BGB	BETTY GO BELMONTE
BGC	BONIFACIO GLOBAL CITY
BDMC	BACOOR DOCTOR'S MEDICAL CENTER
COA	COMMISSION ON AUDIT
DCMC	DASMARIÑAS CITY MEDICAL CENTER
EAMC	EAST AVENUE MEDICAL CENTER
FCM	FAIRVIEW CENTER MALL
IFH	IMUS FAMILY HOSPITAL
FUMC	FATIMA UNIVERSITY MEDICAL CENTER
JRU	JOSE RIZAL UNIVERSITY
LCP	LUNG CENTER OF THE PHILIPPINES
MMC	MUNTINLUPA MEDICAL CENTER
MSMC	METRO SOUTH MEDICAL CENTER
NAIA	NINYO AQUINO INTERNATIONAL AIRPORT
NKTI	NATIONAL KIDNEY TRANSPLANT INSTITUTE
PITX	PARAÑAQUE INTEGRATED TERMINAL EXCHANGE
QMMC	QUIRINO MEMORIAL MEDICAL CENTER
RMC	RIZAL MEDICAL CENTER
SAMC	SOUTHEAST ASIAN MEDICAL CENTER
SDMC	ST. DOMINIC MEDICAL CENTER
SJDM	SAN JOSE DEL MONTE
VGC	VALENZUELA GATEWAY COMPLEX

LEGEND

ROUTES

1	EDSA CAROUSEL	10	MONUMENTO - EDSA TAIT
2	MONUMENTO - BALAGTAS	11	PITX-NAIA LOOP
3	MONUMENTO - VGC	12	NORTH EDSA - BGC
4	QUEZON AVENUE - ANGAT	13	MONUMENTO - BAYANLEPU
5	QUEZON AVENUE - MONTALBAN	14	MONUMENTO - SJDM
6	CUBAO - ANTIPOLLO	15	MONUMENTO - PASAY
7	GILMORE - TAYTAY	16	PITX - PASAY
8	VALINTONG - PASAY	17	PITX - CHANCE MALL
9	ANGAT - BGC	18	PITX - DASMARIÑAS
10	ANGAT - BGC	19	PITX - GENERAL RAMOS MALL
11	ANGAT - BGC	20	ANGAT - BGC

SYMBOLS

- ORIGIN/DESTINATION
- BUS STOPS
- CONNECTING STOPS

Train Routes

# Iteration 1

## Problem Identification

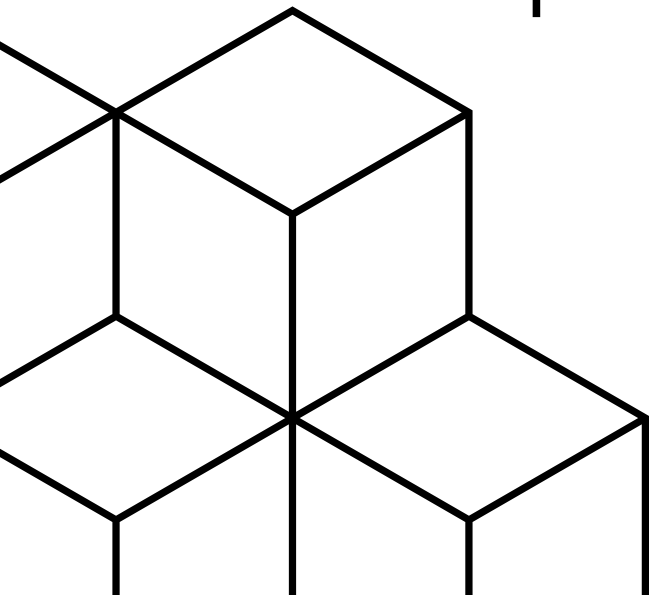
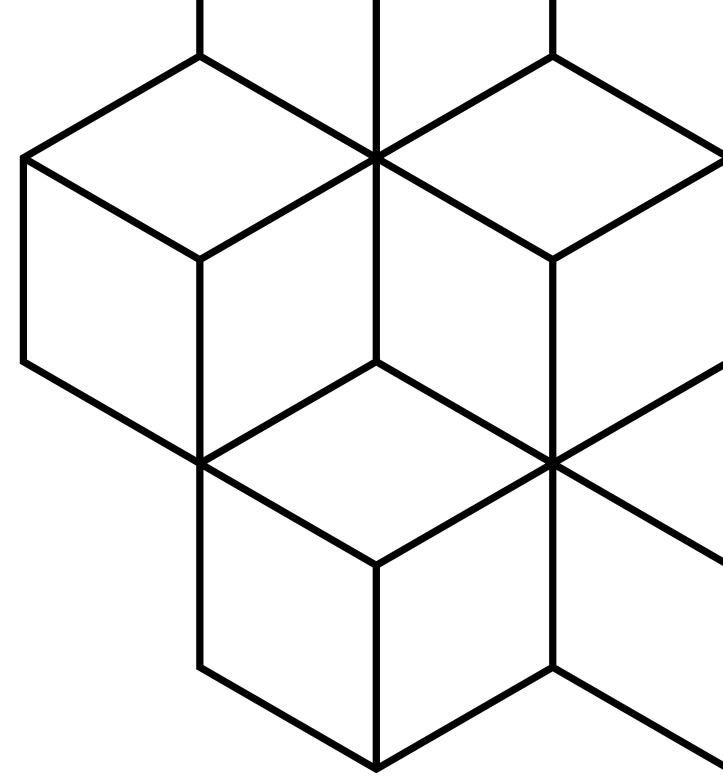
- 5 Bus Transit Routes running through Quezon City
- 2 Railway Transit Lines

## **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

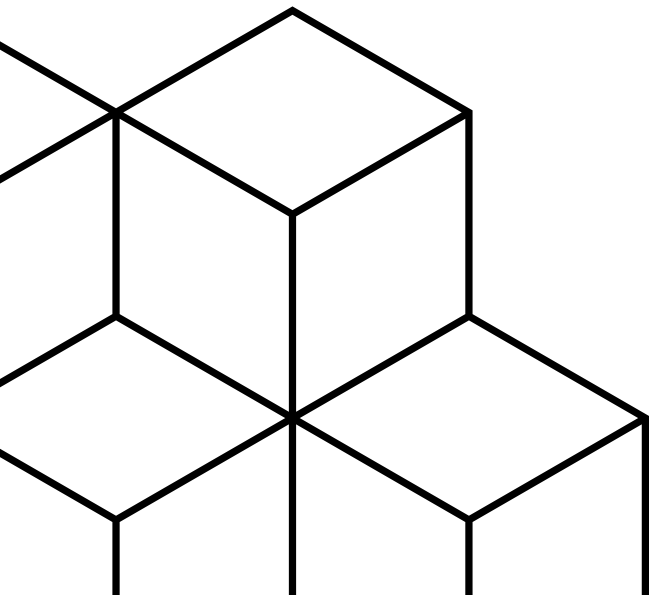
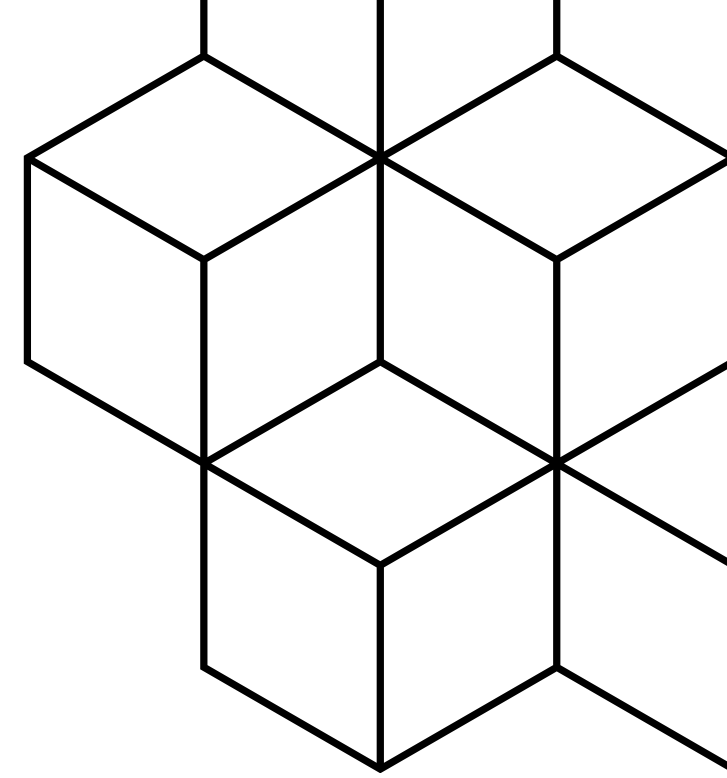
# Pattern Recognition

- 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

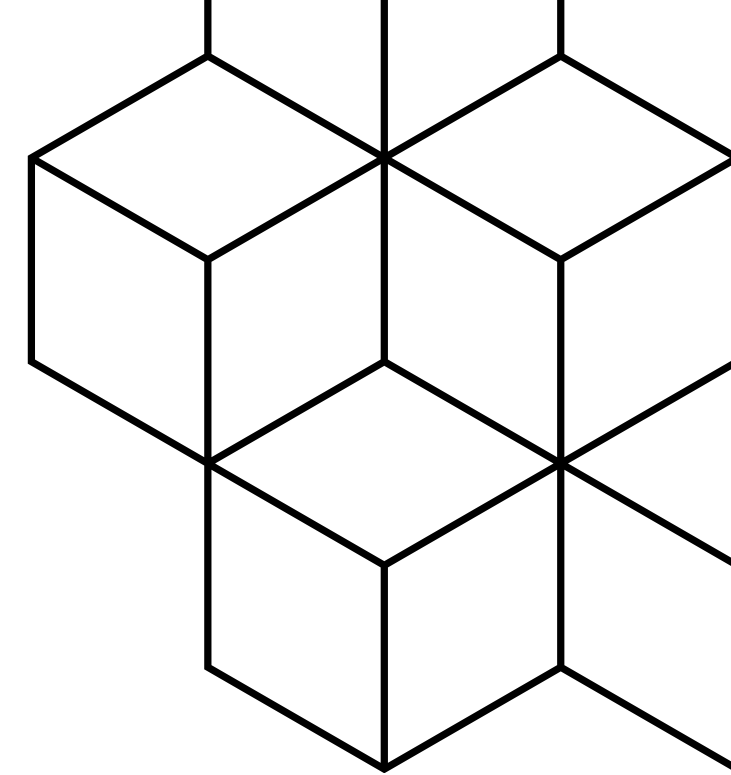


# Abstraction

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



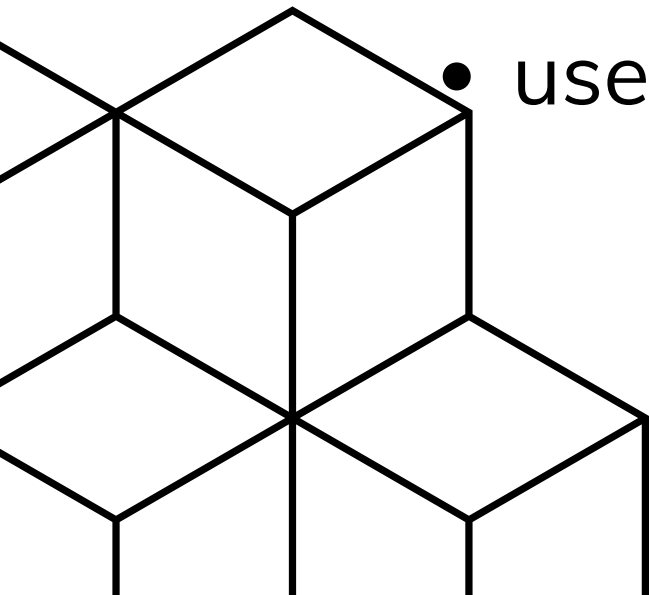
# Iteration 2



## 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

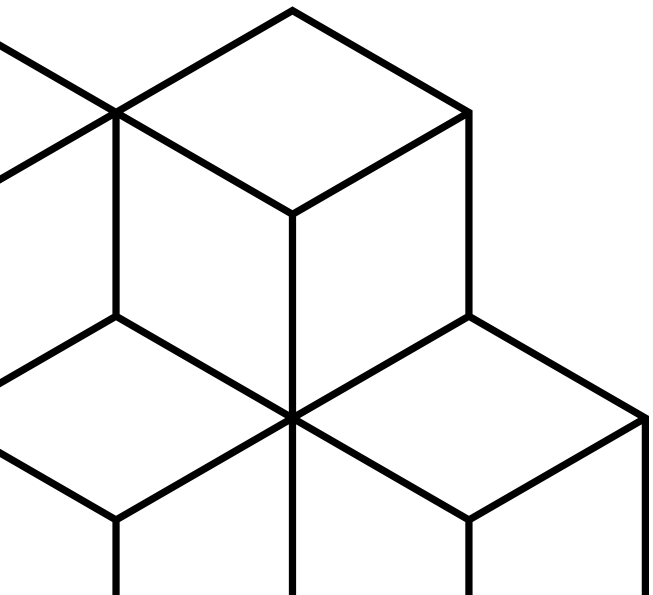
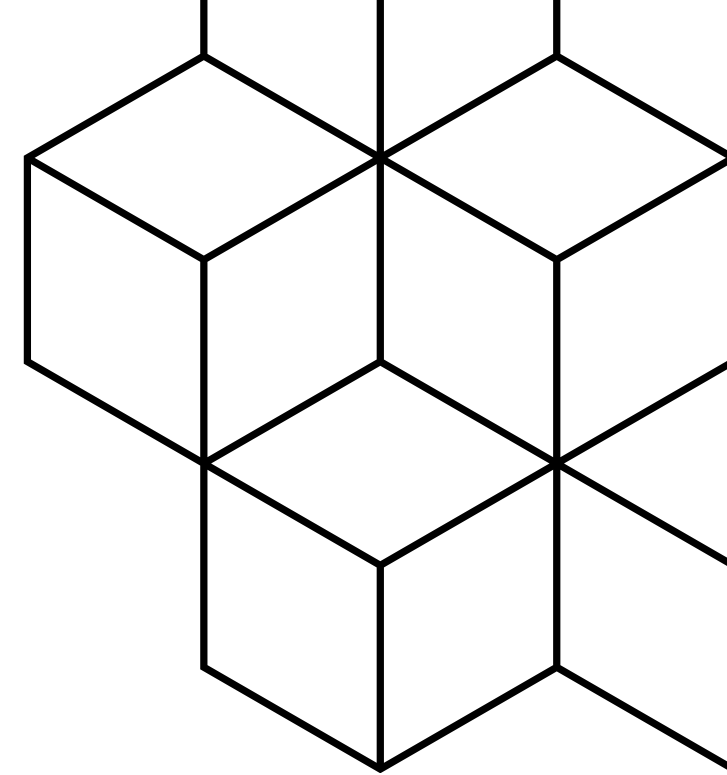
## Decomposition

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