

# TRANSPORTATION

## IN THE PHILIPPINES

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# TOPIC OUTLINE

★ PROBLEM ★

★ SOLUTION ★

★ ALGORITHM ★

★ TECHNIQUES ★

# PROBLEM



# **TRAVEL DISTANCE IN COMMUTING**

With the traffic at all all-time high nowadays, long commute travel distances can significantly affect an individual's stress, fatigue, and productivity. Such problems not only impose upon the commuter a longer travel time, it may also impose higher transportation costs.



# SOLUTION



# IDENTIFICATION

As such, the best thing we can do for now is to identify the problem, break it down, find related solutions, and abstract it.

# ITERATION 1



# PROBLEM IDENTIFICATION

How can we develop a system that analyzes transportation networks to identify the most cost-effective and shortest route for commuters traveling from home to school?

## DECOMPOSITION

Sub-problems:

- Identify all possible routes
- Analyze the cost (fare) per route
- Estimate the travel time per route

## PATTERN RECOGNITION

- Use of ride-hailing/sharing applications like Grab and Angkas
- Riding the different forms of PUVs, such as tricycles and jeepneys

## ABSTRACTION

Relevant Information:

- Locations of home, stops/stations, and school

Irrelevant Information:

- Unrelated Destinations
- Mode of transportation

# ITERATION 2



# PROBLEM IDENTIFICATION

I want to list, compare, and analyze all possible routes from home to school so we can identify the one with the shortest distance and the one that costs the least. How can I build an algorithm to do this work?

## DECOMPOSITION

Sub-problem:

- Generate all routes
- Compare the distance of each route
- Find the best route using Depth-First Search

## PATTERN RECOGNITION

- Commuters may still use familiar routes and overlook shorter or cheaper alternatives.

## ABSTRACTION

Include:

- Locations, and Distance for each route segment

Do not include:

- Unrelated destinations or route options not considered in the exploration

# ALGORITHM

The algorithm used for the solution of the problem is:

- Graph Theory
- Dijkstra Algorithm
- Depth-First Search Algorithm



## ALGORITHM IN ACTION

The link below shows all of the possible routes in the commute of a student in T.I.P., and the animation of how a route is traversed using DFS:

[https://drive.google.com/drive/folders/1zY5c8Er2UR48pSNEhR2kOPcFC0QNhwJR?usp=drive\\_link](https://drive.google.com/drive/folders/1zY5c8Er2UR48pSNEhR2kOPcFC0QNhwJR?usp=drive_link)



# TECHNIQUE

The graph is utilized in solving this problem; The locations of the home, school, and stops/stations are stored as nodes while the edges represent the roads between two locations.



**THANK YOU FOR  
LISTENING!**