

CASE STUDY 1: SOLVING REAL-WORLD PROBLEMS USING COMPUTATIONAL THINKING

TRAIN SYSTEM



TEAM 6

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PROBLEM:

THE DIFFICULTY TO USE THE METRO MANILA
RAILWAY TRANSIT SYSTEM.

ITERATION

01

PROBLEM IDENTIFICATION

There are 3 different railway transits in Metro Manila.

DECOMPOSITION

HOW WOULD YOU BREAK DOWN YOUR PROBLEM INTO SUB- PROBLEMS?

- Listing down the routes that each LRT/MRT station takes

PATTERN RECOGNITION

ARE THERE RELATED SOLUTIONS TO DRAW ON?

- Each line have different start and end station
- There is one station that is near with one another
- Each station are in different areas

ABSTRACTION

HOW WOULD YOU ABSTRACT THIS PROBLEM?

- What station am I in and where?
- Is there other railway transit available in the station I'm in?

ITERATION

02

PROBLEM IDENTIFICATION

Finding the most efficient route (via Train) and determining the fare between the designated train stations.

DECOMPOSITION

HOW WOULD YOU BREAK DOWN YOUR PROBLEM INTO SUB- PROBLEMS?

- Identifying all possible routes between those 3 stations
- Fare depending on the Beep Card
- Pricing of the Beep Card

PATTERN RECOGNITION

ARE THERE RELATED SOLUTIONS TO DRAW ON?

- Some routes may involve transfer between lines.
- Some routes may have faster travel time.
- More stops increase the price of the fare.
- When transferring between trains effects the price of the fare

ABSTRACTION

HOW WOULD YOU ABSTRACT THIS PROBLEM?

- Knowing the Beep card pricing and fare structure to provide accurate fare pricing
- Number of transfers between lines.
- Total travel journey.
- Efficiency in terms of fare price and direction.

ITERATION

03

PROBLEM IDENTIFICATION

Developing an algorithm that finds the shortest path.

DECOMPOSITION

HOW WOULD YOU BREAK DOWN YOUR PROBLEM INTO SUB- PROBLEMS?

- Identifying the start and end stations
- Finding all possible routes
- Evaluate each route found
- Selecting the shortest one

PATTERN RECOGNITION

ARE THERE RELATED SOLUTIONS TO DRAW ON?

- Implementation of a path finding algorithm (DFS)
- Considering current-time fare prices

ABSTRACTION

HOW WOULD YOU ABSTRACT THIS PROBLEM?

- Train network that includes the stations, lines, and their connections (Graph)
- Implementing the algorithm to find the shortest route.

