

Plan your trip by train in Singapore

~ Using the Land Transport Authority (LTA) API ~

5th Sep 2023
Project by Haruka Kozen






imagine...

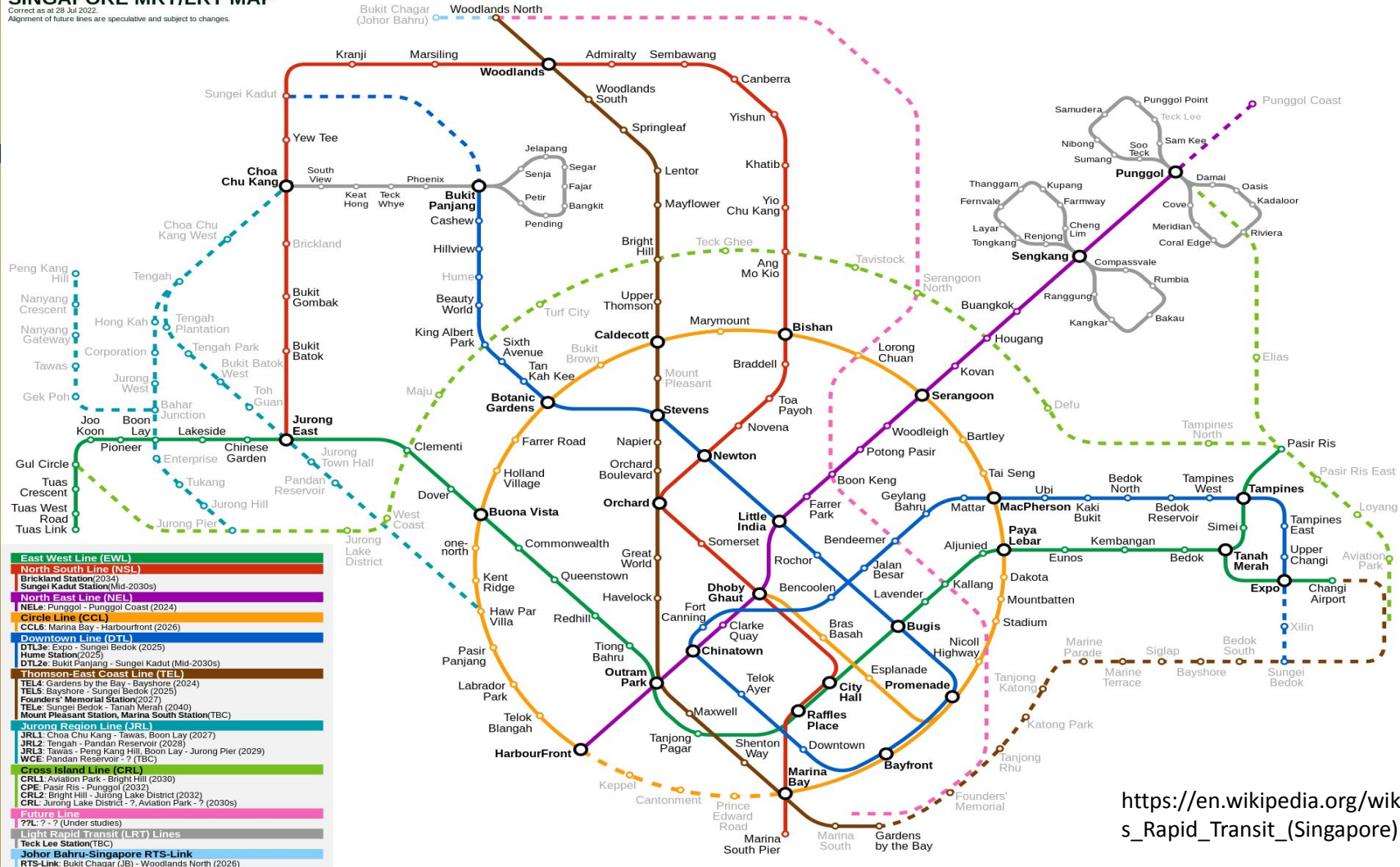
Suppose you work for a company in Singapore
that has a flextime system.

You want to know
when the station is not crowded!



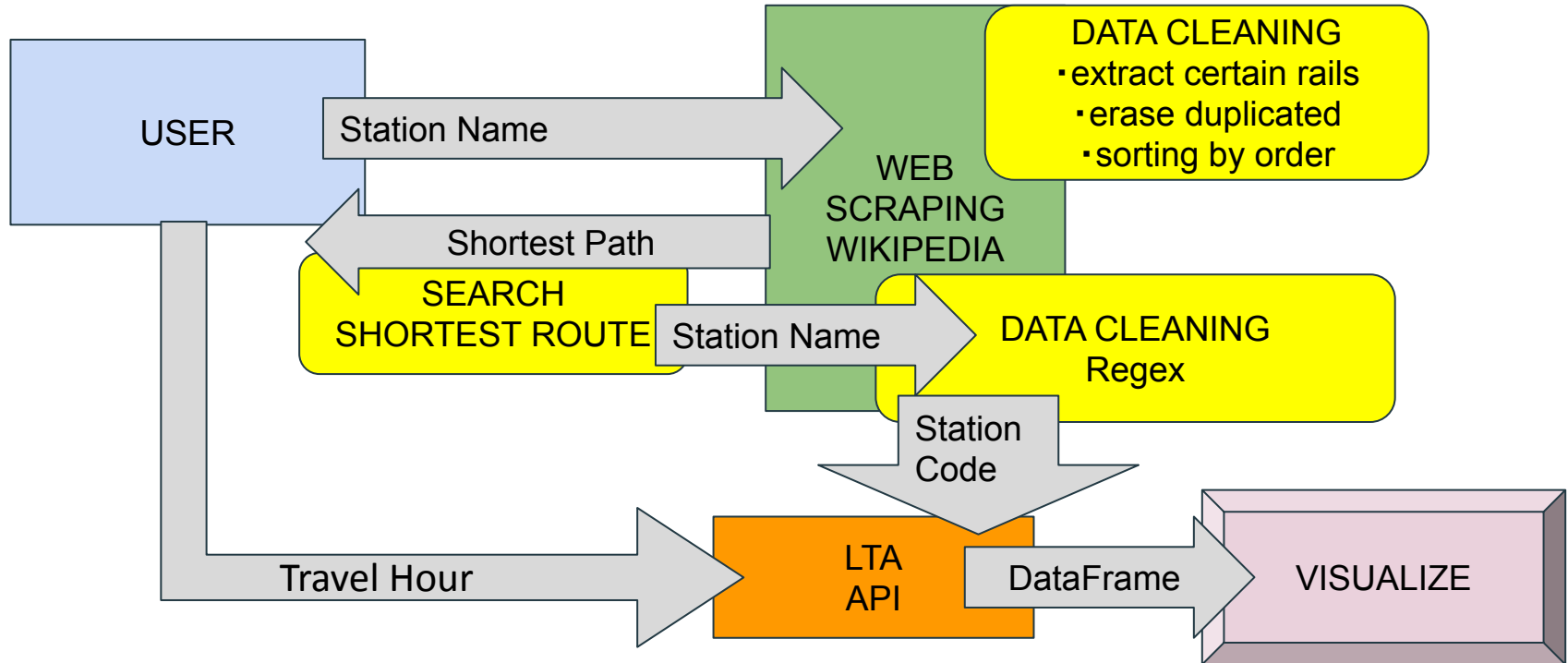
SINGAPORE MRT/LRT MAP

Correct as at 28 Jul 2022.
Alignment of future lines are speculative and subject to changes.



[https://en.wikipedia.org/wiki/Mas_s_Rapid_Transit_\(Singapore\)](https://en.wikipedia.org/wiki/Mas_s_Rapid_Transit_(Singapore))

Structure of the Application



Data sets from API

YEAR_MONTH	DAY_TYPE	TIME_PER_HOUR	PT_TYPE	PT_CODE	TOTAL_TAP_IN_VOLUME	TOTAL_TAP_OUT_VOLUME
2023-07	WEEKENDS/HOLIDAY	11	TRAIN	NS7	4832	8669
2023-07	WEEKDAY	11	TRAIN	NS7	8309	7461
2023-07	WEEKDAY	16	TRAIN	SW4	1066	2251
2023-07	WEEKENDS/HOLIDAY	16	TRAIN	SW4	701	742
2023-07	WEEKDAY	10	TRAIN	CC5	1388	2409
2023-07	WEEKENDS/HOLIDAY	10	TRAIN	CC5	727	1364
2023-07	WEEKENDS/HOLIDAY	13	TRAIN	CC23	1111	1026
2023-07	WEEKDAY	13	TRAIN	CC23	5801	6139
2023-07	WEEKENDS/HOLIDAY	22	TRAIN	EW33	533	876
2023-07	WEEKDAY	22	TRAIN	EW33	722	1178
2023-07	WEEKENDS/HOLIDAY	14	TRAIN	CC21	2336	2005
2023-07	WEEKDAY	14	TRAIN	CC21	4048	4690
2023-07	WEEKDAY	12	TRAIN	TE16	3092	2046
2023-07	WEEKENDS/HOLIDAY	12	TRAIN	TE16	1872	1510
2023-07	WEEKDAY	18	TRAIN	EW24/NS1	124409	89599
2023-07	WEEKENDS/HOLIDAY	18	TRAIN	EW24/NS1	30541	28265
2023-07	WEEKENDS/HOLIDAY	7	TRAIN	NE10	2774	2356

Data sets from Wikipedia

WEB SCRAPING

NS27 CE2 TE20 🚶 🚲 ⚠️	Marina Bay	滨海湾	மரீனா பே	January 2012	Marina Bay
Downtown Line (DTL)					
—	<i>Sungei Kadut</i>	双溪加株	சுங்கை காடூத்	Mid-2030s	Sungei Kadut
BP6—DT1 🚶 🚲 ⚠️	Bukit Panjang	武吉班让	புக்கிட் பாஞ்சாங்	27 December 2015	Petir
DT2 🚶 🚲 ⚠️	Cashew	凯秀	கேஷ்யூ		Cashew / Chestnut / Hazel Park
DT3 🚶 🚲 ⚠️	Hillview	山景	ஹில்வியூ		Hillview / Dairy Farm / Upper Bukit Timah

	Alpha-numeric code(s)		Station name	Opening	Name(s) during planning stages	
	In operation	English · Malay	Chinese	Tamil	Opening	Name(s) during planning stages
0	North–South Line (NSL)	North–South Line (NSL)	North–South Line (NSL)	North–South Line (NSL)	North–South Line (NSL)	North–South Line (NSL)
1	NS1 EW24	Jurong East	裕廊东	ஜூரோங் கிழக்கு	10 March 1990	Jurong East
2	NS2	Bukit Batok	武吉巴督	புக்கிட் பாத்தோக்	10 March 1990	Bukit Batok South
3	NS3	Bukit Gombak	武吉甘柏	புக்கிட் கோம்பாக்	10 March 1990	Bukit Batok North

Output of the Shortest Path

What is your origin station?: Caldecott

Where is your destination?: Downtown

Your shourtest path uses the following stations:

1: Caldecott

2: Botanic Gardens • Kebun Bunga

3: Stevens

4: Newton

5: Little India

6: Rochor

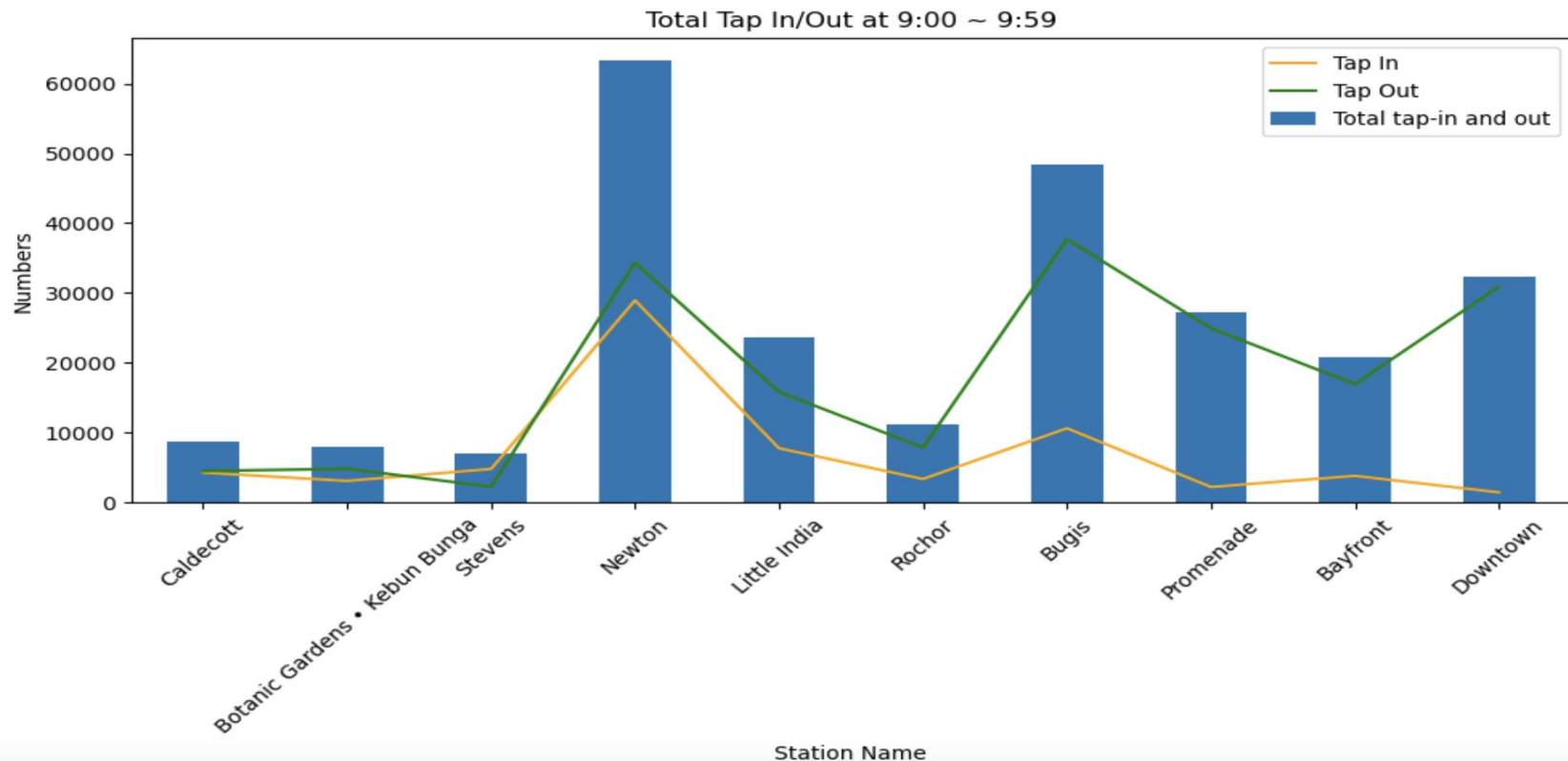
7: Bugis

8: Promenade

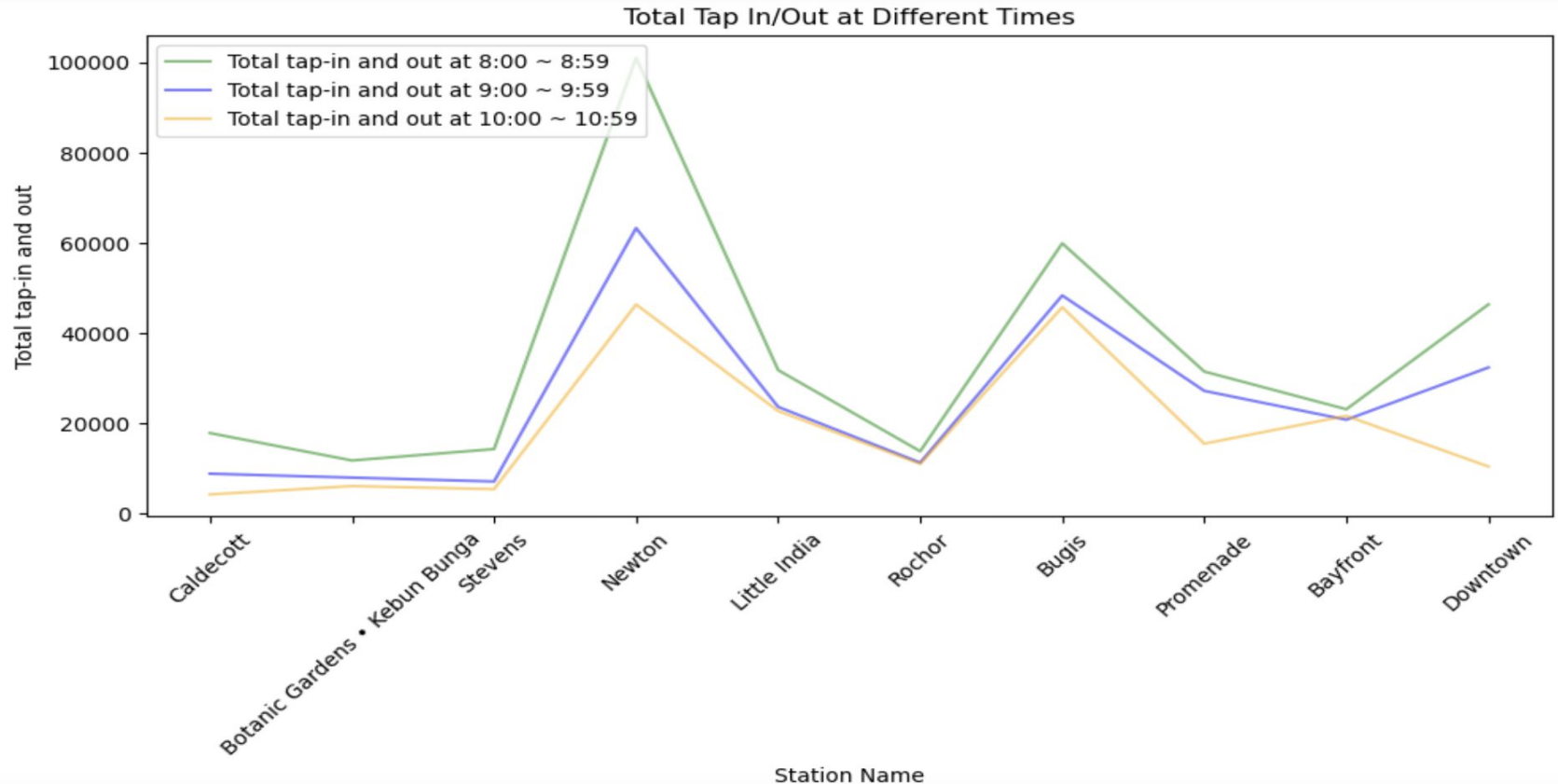
9: Bayfront

10: Downtown

VISUALIZATION OF Tap-in and Tap-out



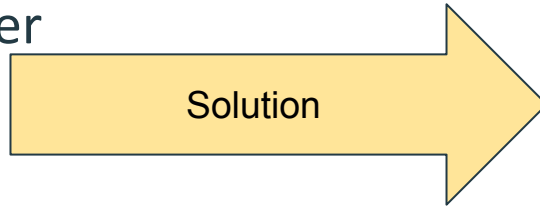
VISUALIZATION OF 1 hour Before and After



Challenges and Learning

- Data Inconsistency caused by Getting Data from another source (Wikipedia, API)

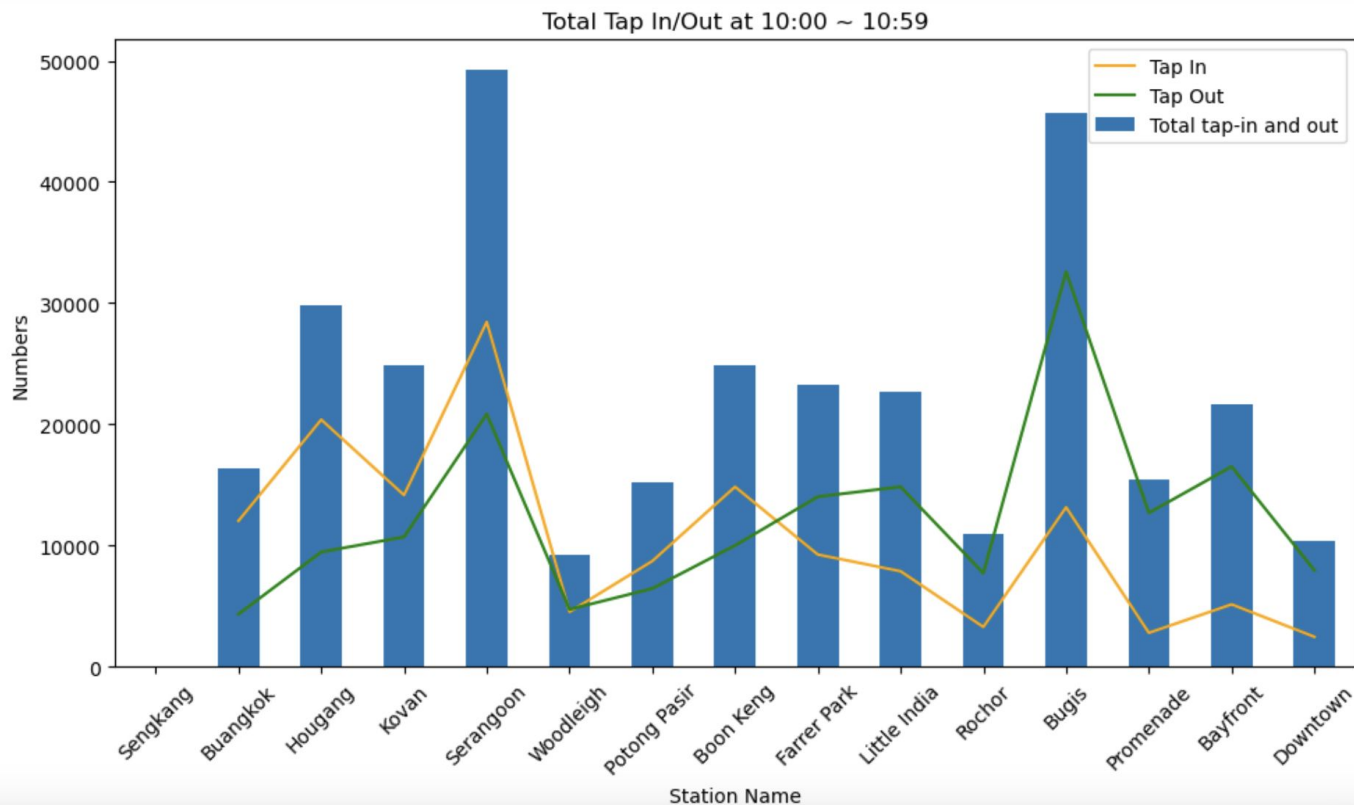
- Combination of User interaction, Functions, and DataFrames.



Data Cleaning
such as Regex

Careful Consideration and
Planning of modification/saving
of DataFrames.

Findings from the data



Serangoon and Bugis has multiple lines.

More people get out at Bugis.

Thank you!

List of Singapore MRT stations

https://en.wikipedia.org/wiki/List_of_Singapore_MRT_stations

Land Transport API

<https://datamall.lta.gov.sg/content/datamall/en.html>