Title: Star Schema Design for Bike Sharing Data.

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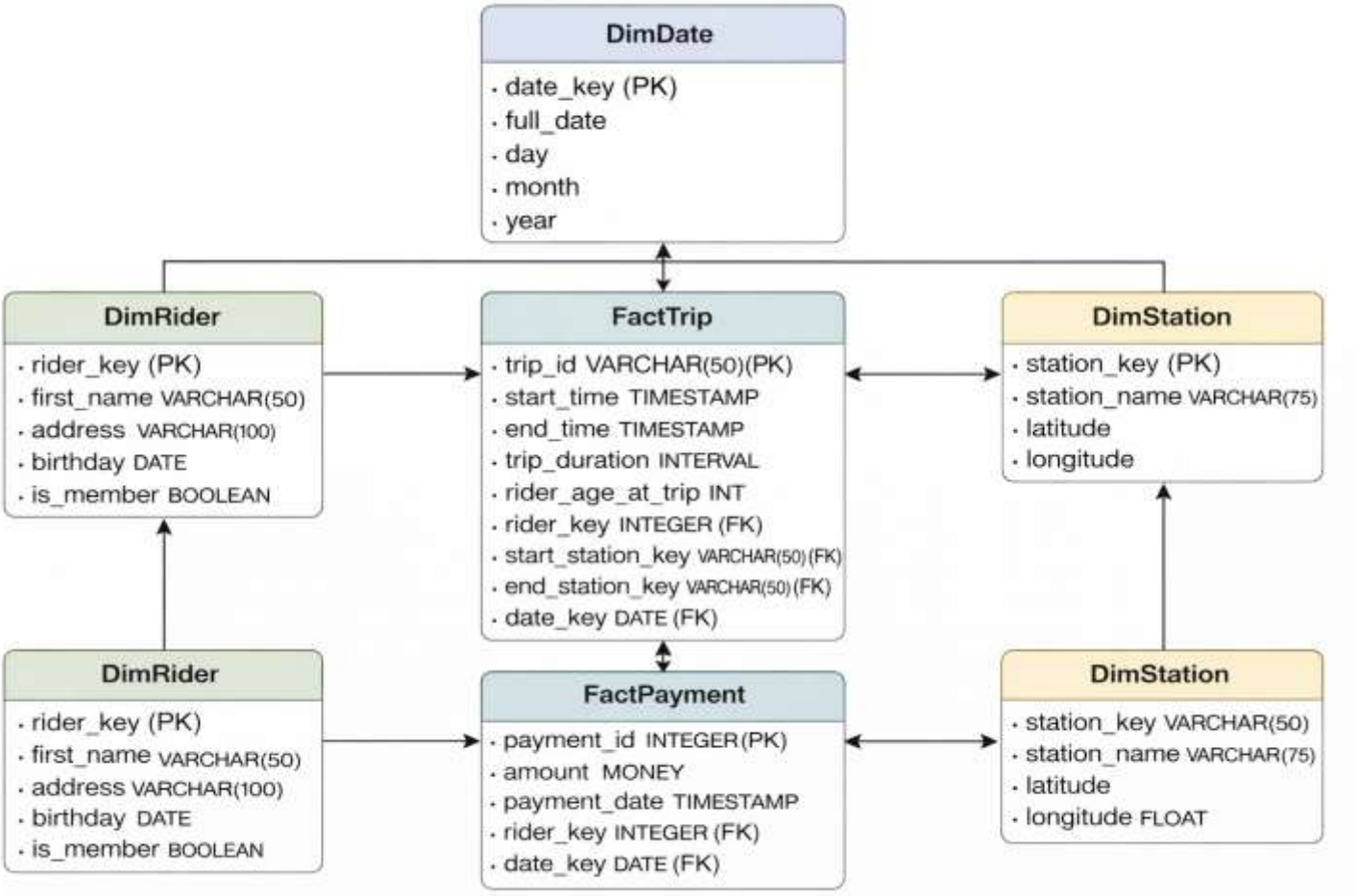
Explanation of Star Schema:

A star schema is a data modeling approach used in data warehousing to organize data in a simple and efficient way for analysis. In this design, the main fact tables store important business data such as trip details and payment information, while the surrounding dimension tables provide descriptive details like rider information, station details, and dates. This structure makes the data easy to understand, reduces query complexity, and improves performance. In this project, the star schema helps analyze trip behavior, rider activity, station usage, and trends over time.



Dimension Tables Description

DimRider

Purpose: Stores rider-related details.

Column	Description
rider_key (PK)	Unique rider identifier
first_name	Rider first name

Column	Description
address	Rider address
birthday	Date of birth
is_member	Membership status

Explanation:

This dimension allows analysis of trips and payments based on rider demographics and membership status.

DimStation

Purpose: Stores station details.

Column	Description
station_key (PK)	Unique station identifier
station_name	Name of station
latitude	Geographic latitude
longitude	Geographic longitude

Explanation:

This dimension enables analysis of trip start and end locations.

DimDate

Purpose: Stores date-related attributes.

Column	Description
date_key (PK)	Unique date
full_date	Complete date
day	Day of month
month	Month
year	Year

Explanation:

This dimension supports time-based analysis such as daily, monthly, and yearly trends.

Fact Tables Description

FactTrip

Purpose: Stores trip-related metrics.

Column	Description
trip_id (PK)	Unique trip identifier
start_time	Trip start timestamp

Column	Description
end_time	Trip end timestamp
trip_duration	Duration of trip
rider_age_at_trip	Rider age at time of trip
rider_key (FK)	References DimRider
start_station_key (FK)	References DimStation
end_station_key (FK)	References DimStation
date_key (FK)	References DimDate

Explanation:

FactTrip is the central table used to analyze trip patterns, durations, rider behavior, and station usage.

FactPayment

Purpose: Stores payment transactions.

Column	Description
payment_id (PK)	Unique payment identifier
Amount	Payment amount
payment_date	Timestamp of payment
rider_key (FK)	References DimRider
date_key (FK)	References DimDate

Explanation:

This fact table supports revenue analysis and rider payment history.

Relationships

FactTrip → DimRider

FactTrip → DimStation (Start & End)

FactTrip → DimDate

FactPayment → DimRider

FactPayment → DimDate

The designed star schema efficiently organizes bike-sharing data for analytical purposes.
By separating facts and dimensions, it enables scalable reporting, trend analysis, and decision-making.
This model is suitable for implementation using CETAS in Azure Synapse Analytics.