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INFORMATION
TECHNOLOGY

程序代写代做CS编程辅导



FIT3003 – Business Intelligence and Data Warehousing

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Week 4 – Multi-Fact

Semester 1, 2021

Developed by:
Dr. Agnes Haryanto
Agnes.Haryanto@monash.edu

Agenda

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1. Multi-Fact

1. Different Subject Multi-

2. Multi-Fact or Single Fact Measures



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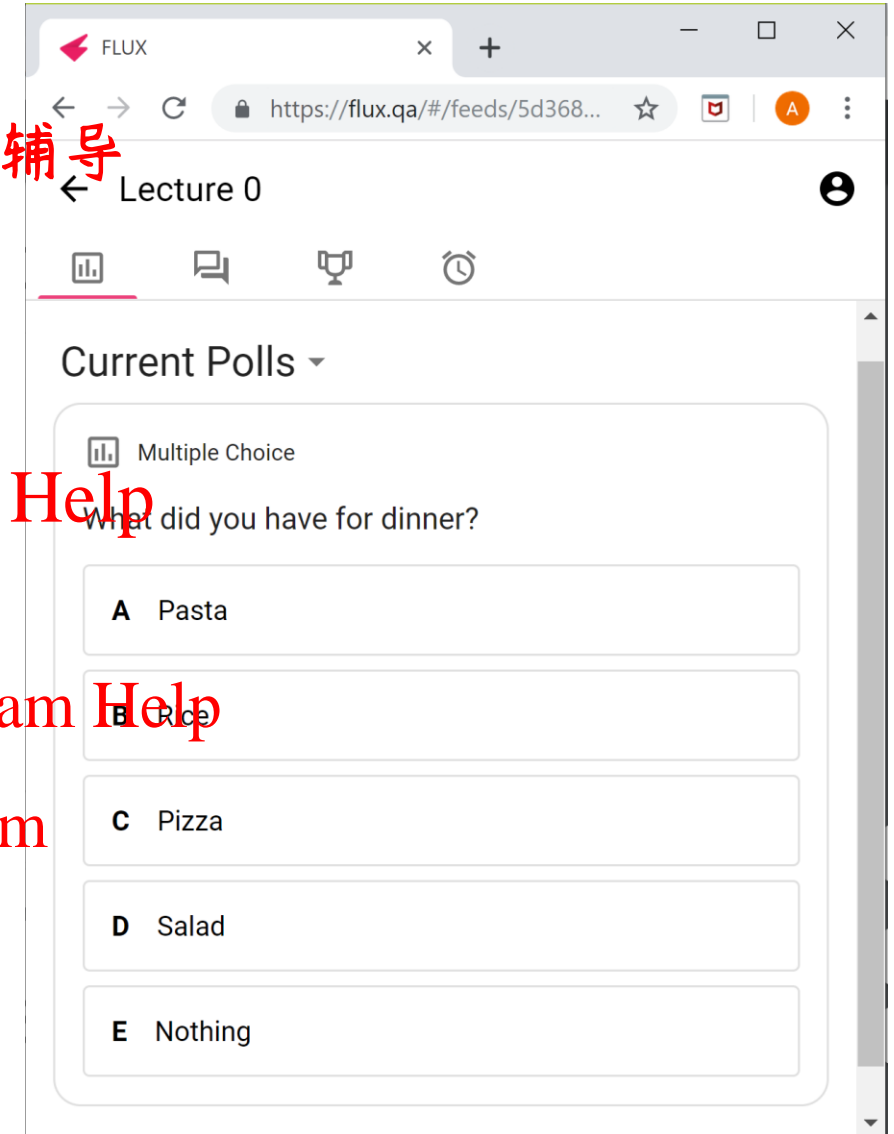
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Multi-Fact

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- A *Subject-Oriented* data warehouse means that one star schema focuses on one subject only.

➤ A subject refers to a topic or class of subjects.



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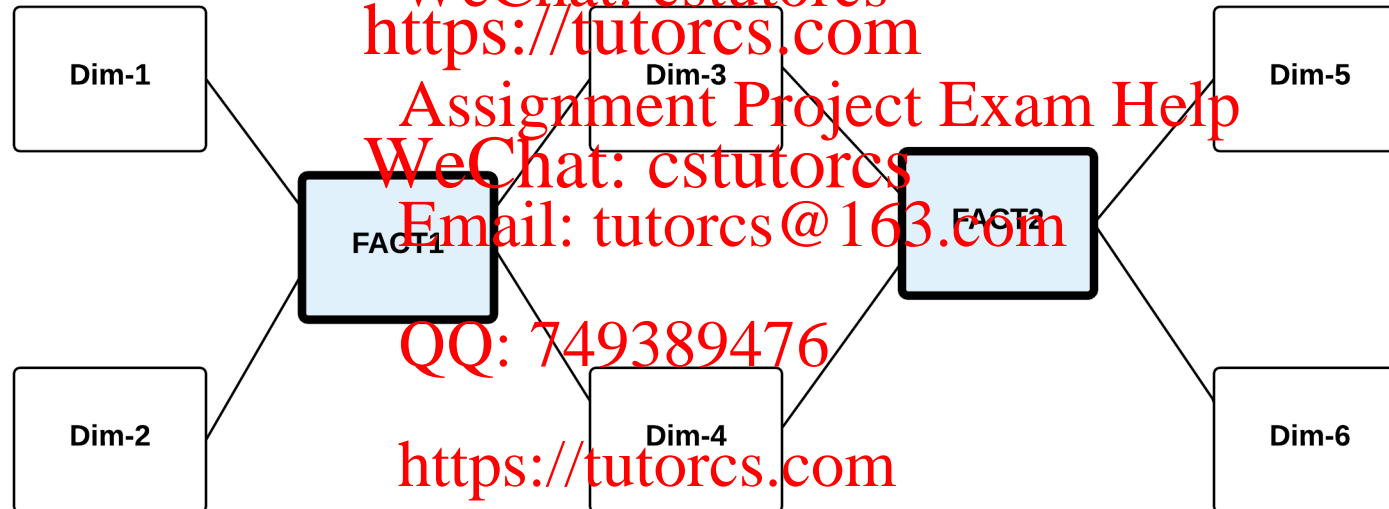
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Multi-Fact

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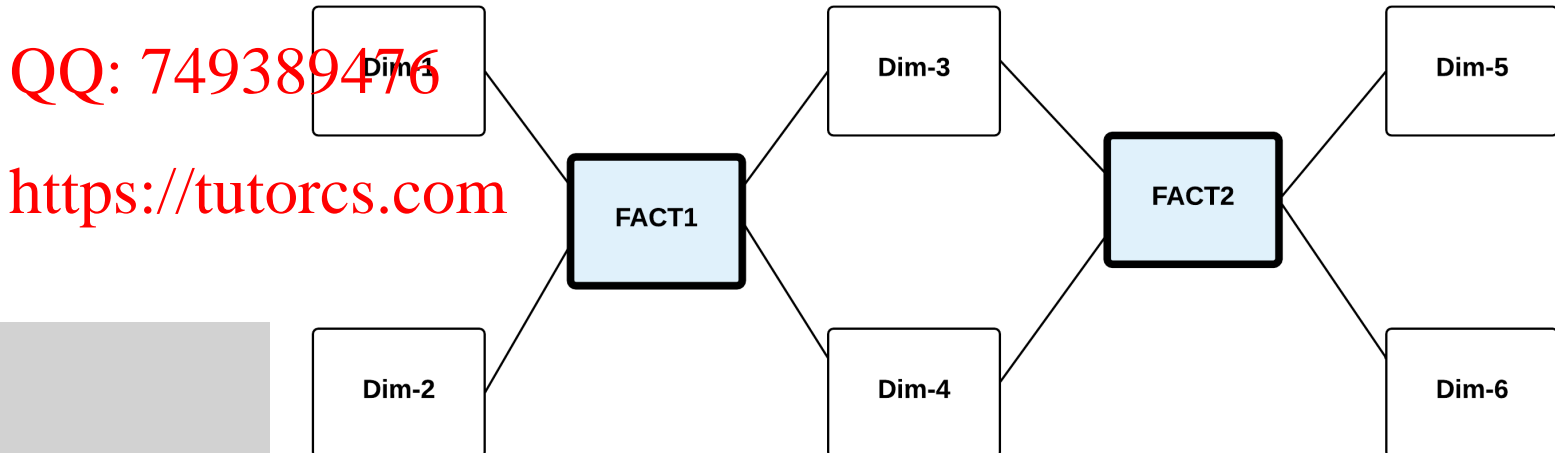
- A subject refers to a topic or subjects.

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- Example:

- Sales of properties & Rental properties

- The two star schemas should not be combined since both focus on different subjects.
- But two separate star schemas can still share the same dimensions



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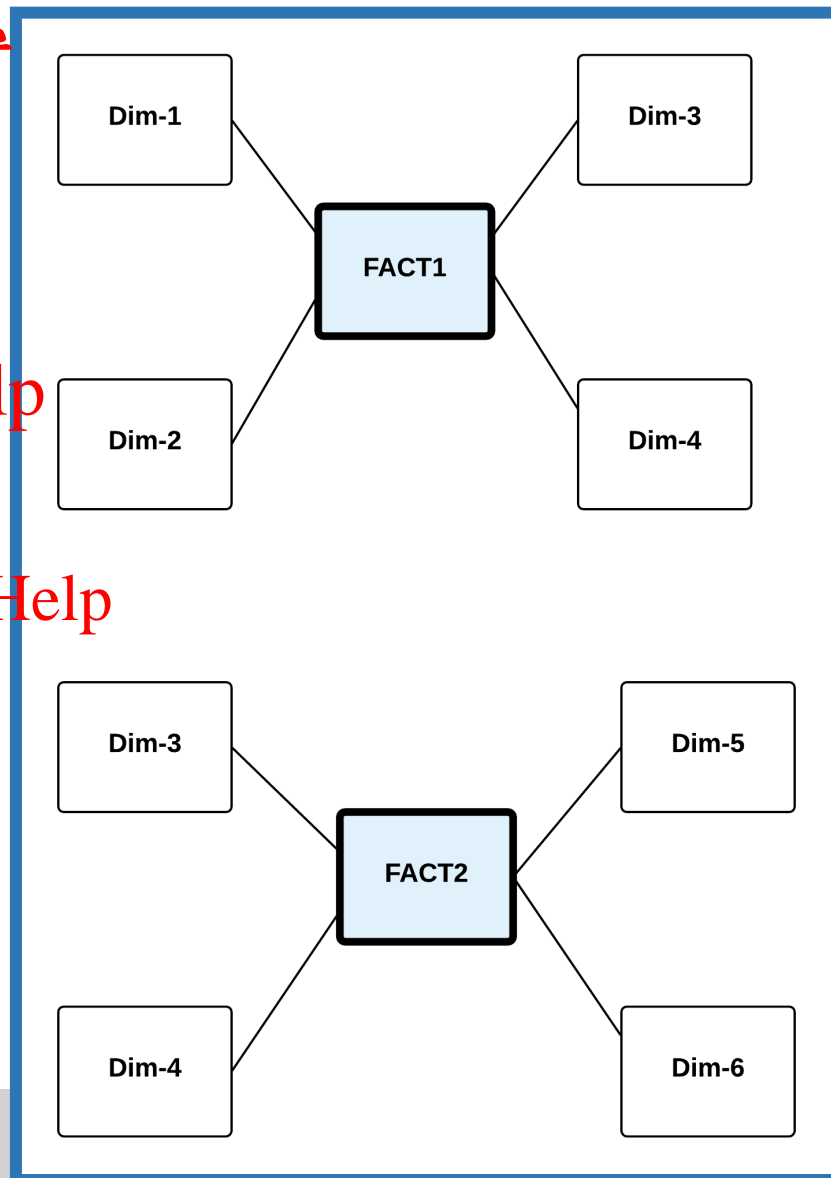
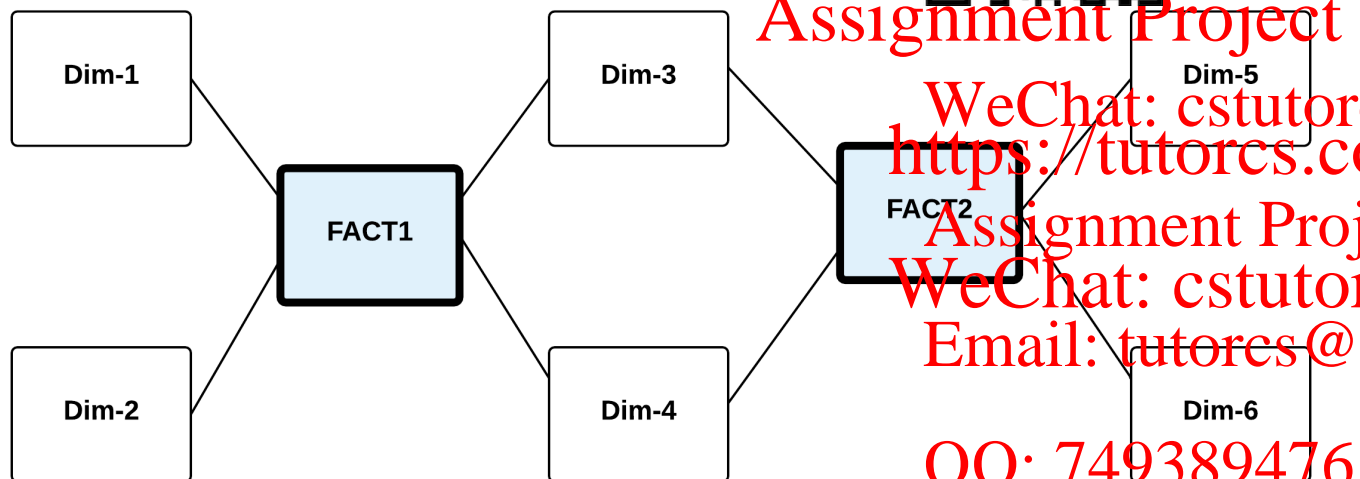
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Multi-Fact

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1. Different Subject Multi-Fact The Book Sales Case Study
2. Multi-Fact or Single Fact Multiple Fact Measures: A Private Taxi Company Case Study
3. To Combine or Not To Combine
4. Different Granularity Multi-Fact



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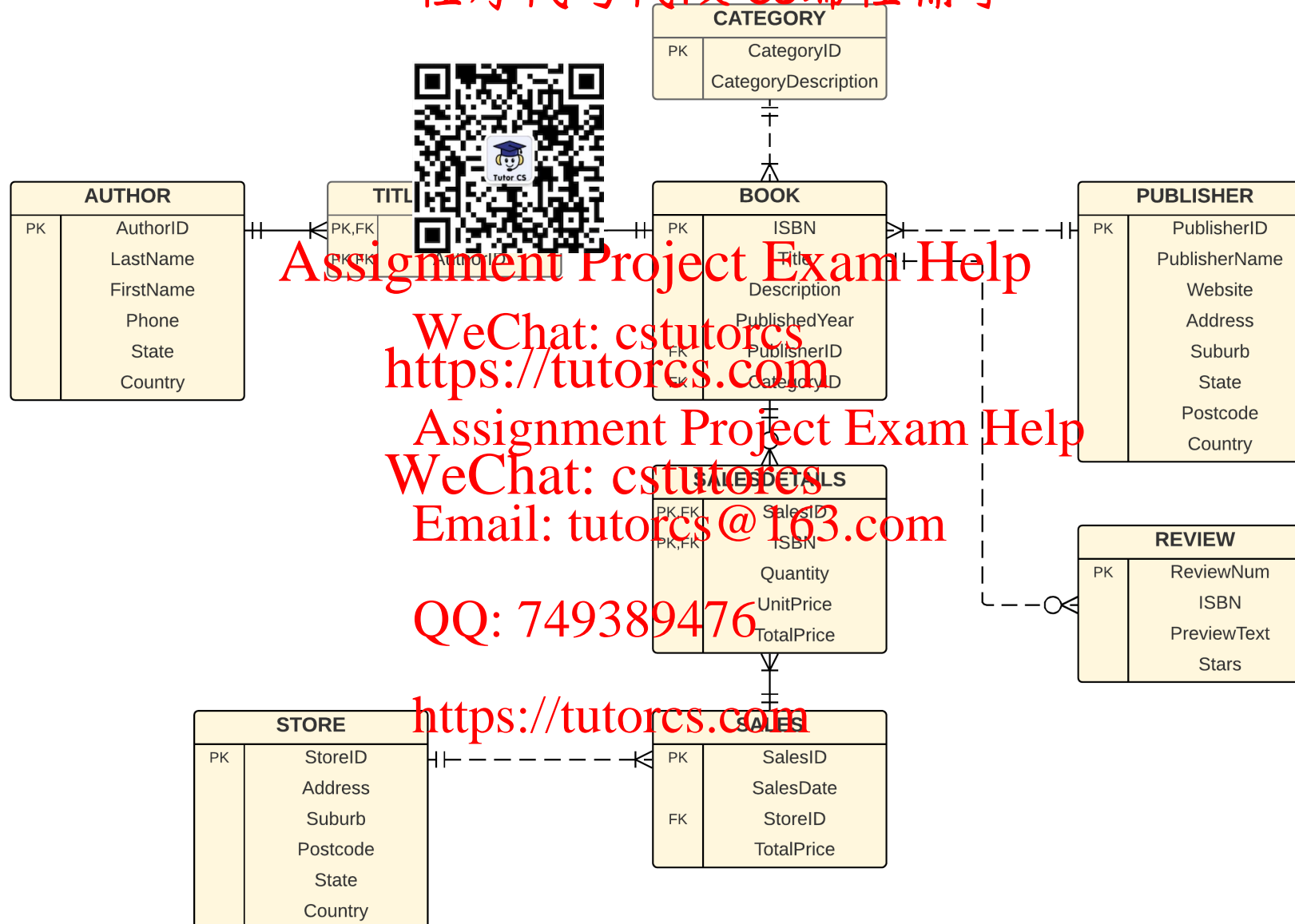
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Different Subject Multi-Fact:
The Book Sales Case Study

The Book Sales Case Study

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The Book Sales Case Study

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The system stores information about books, including the authors, publishers, book categories, as well as the reviews that each book has received. The "stars" attribute in the Review entity records the star rating for each review (5 stars for excellent to 1 star for poor, etc). One book may receive many reviews. For simplicity, it is assumed, as also shown in the E/R diagram, that a book will only have one category.



The E/R diagram also includes entities related to sales of books, and the stores which sell the books. Each store has many sales transactions (i.e. the Sales entity), and each sales transaction may include several books (i.e. the SalesDetails entity). The Total Price attribute in the SalesDetails entity is basically Quantity multiplied by the Unit Price, whereas Total Price in the Sales entity is the total price for each sales transaction.

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The Book Sales Case Study

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The requirements for the data warehouse are quite simple. The data warehouse must be able to answer at least the following questions:

- What are the total sales for each category in a month?
- What is the number of books sold for each category?
- What is the book category that has the highest total sales?
- What is the number of reviews for each category?
- How many 5-star reviews for each category?

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- Based on the requirements, it is clear that there are three fact measures:

1. Total sales,
2. Number of books sold, and
3. Number of reviews.

- The dimensions:

1. Store dimension,
2. Time dimension,
3. Book category dimension, and
4. Star rating dimension.



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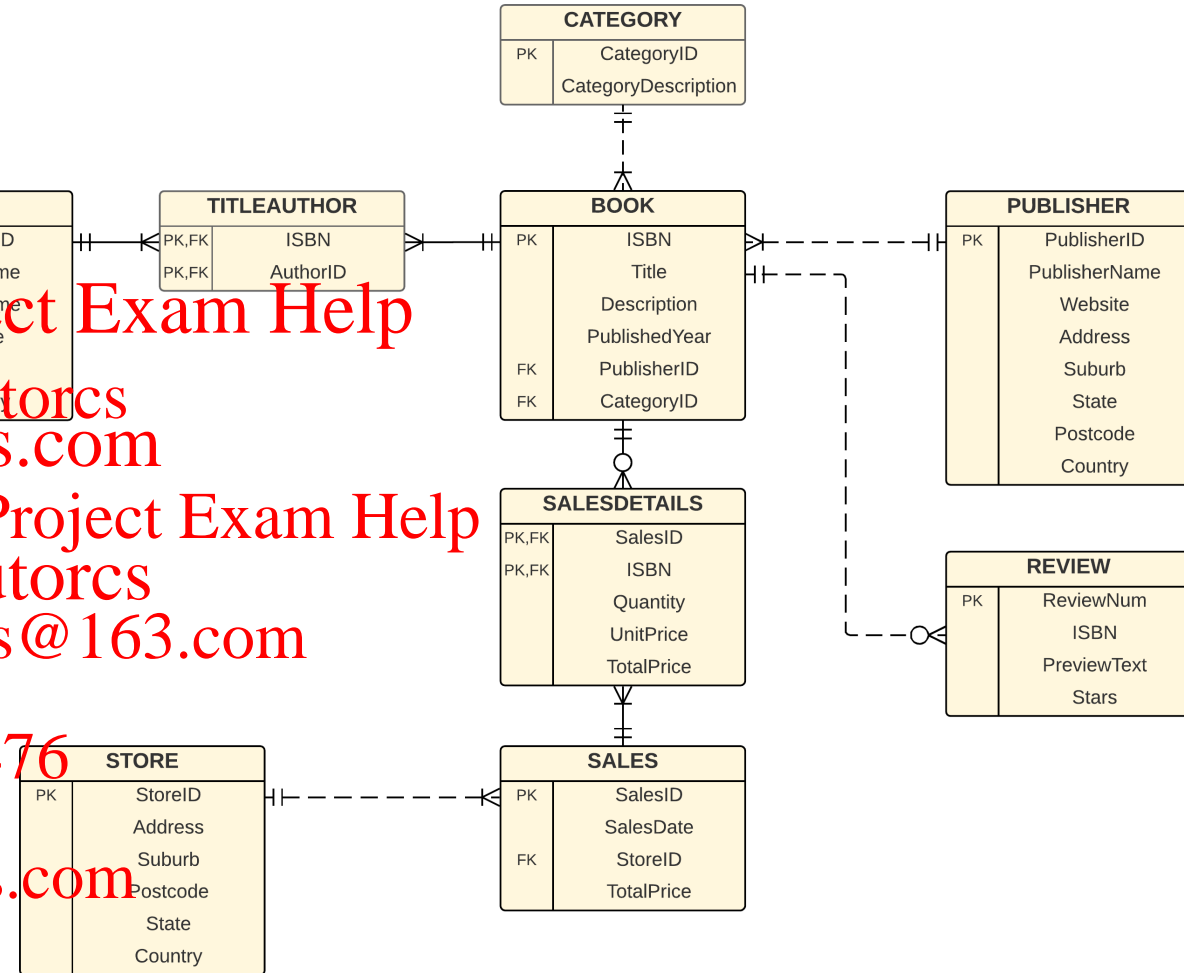
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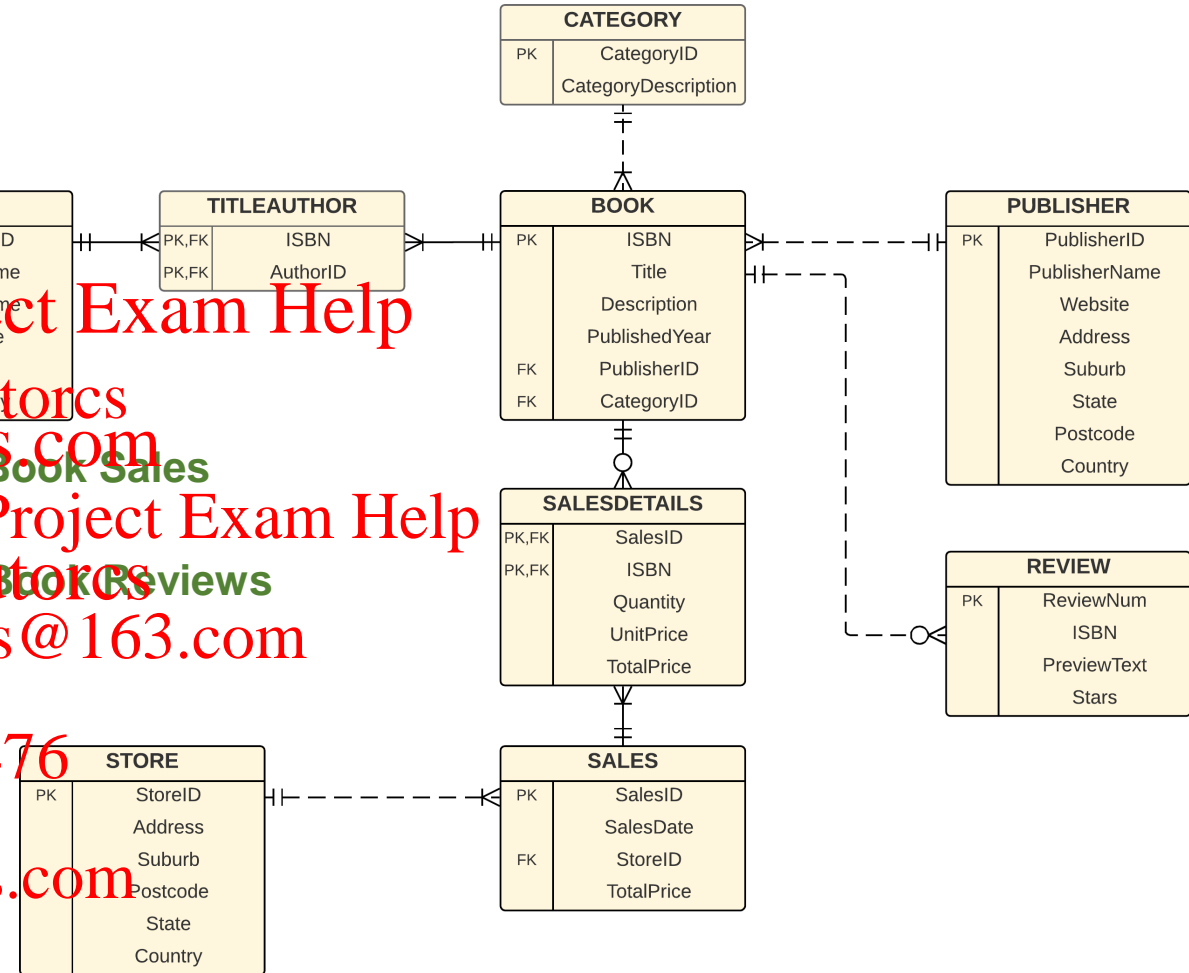
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The Book Sales Case Study

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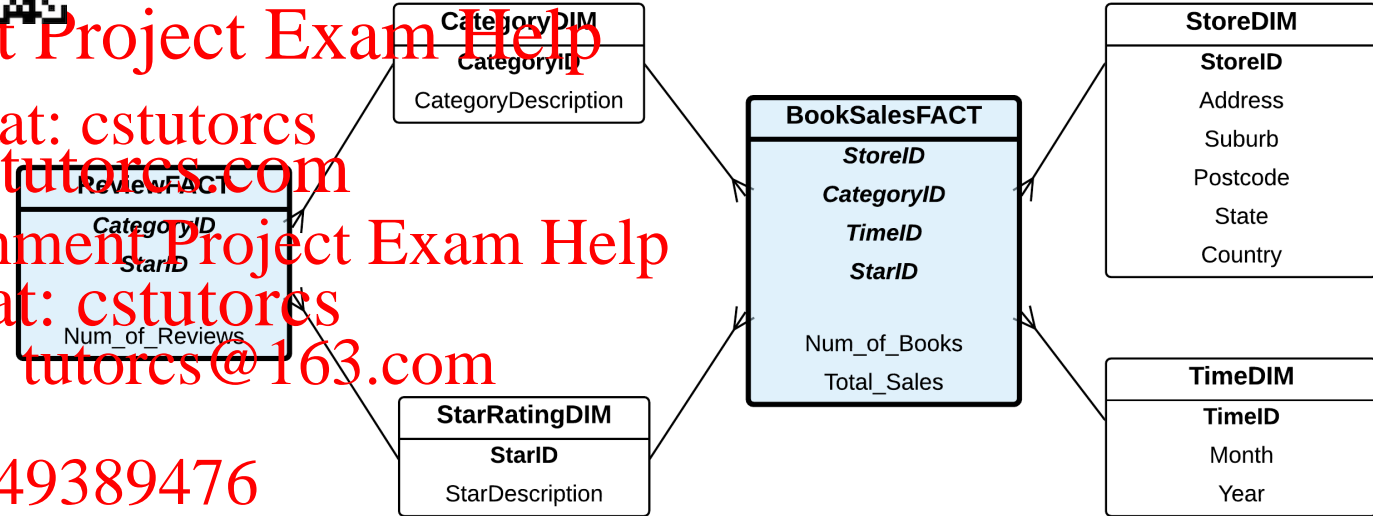
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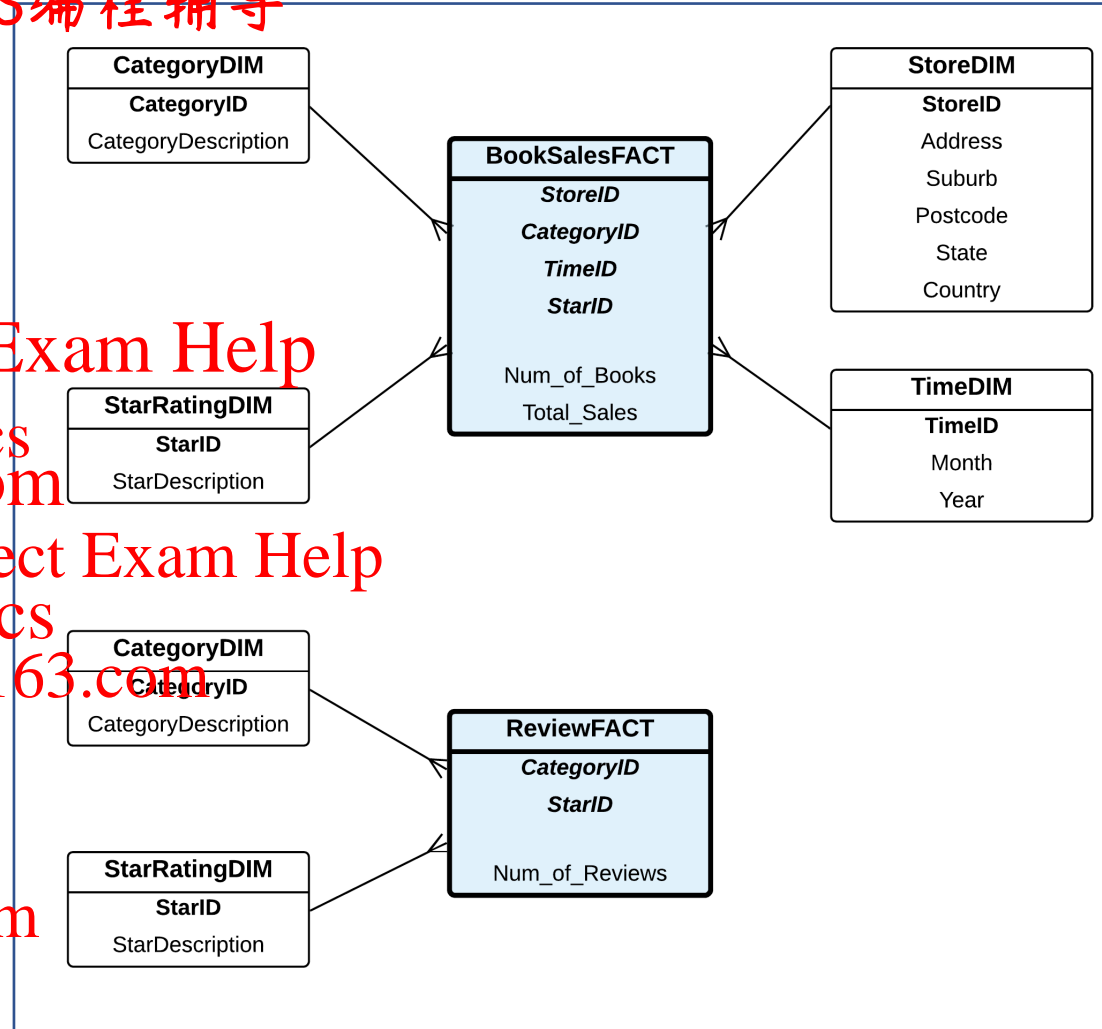
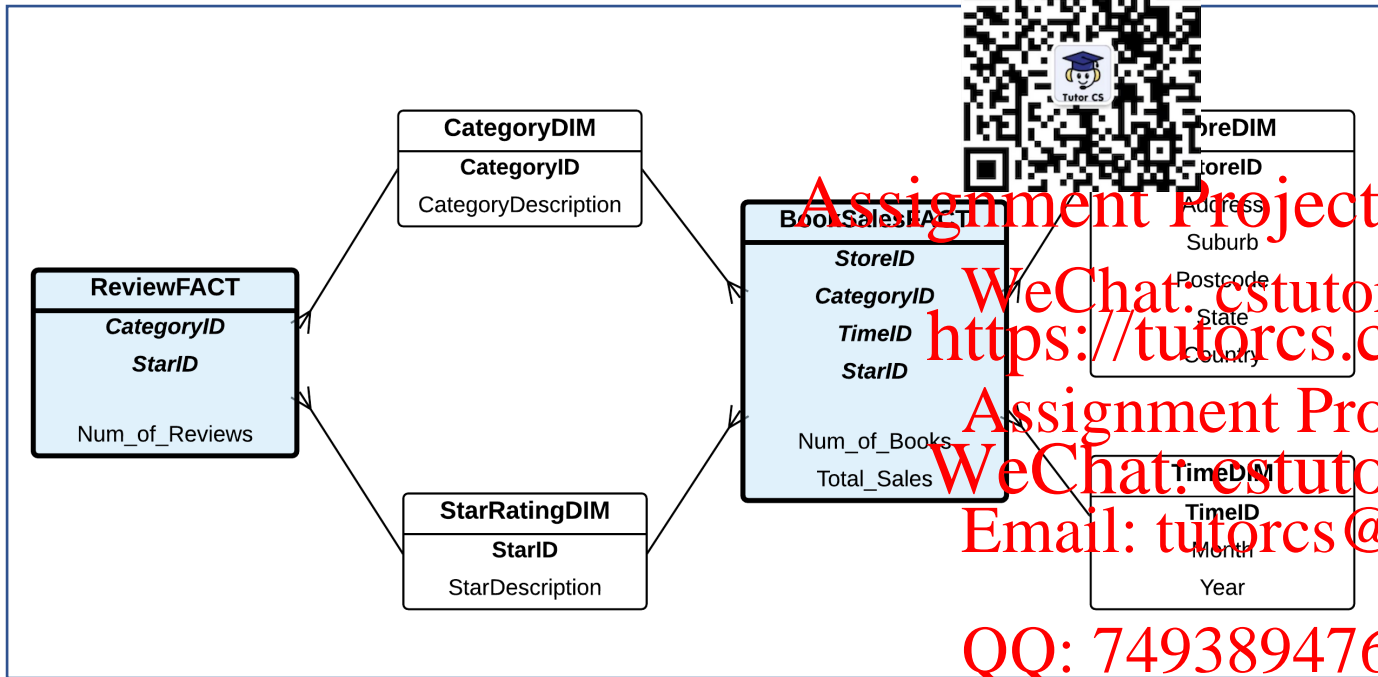


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(b) Two Star Schemas

(a) A Multi-Fact Star Schema



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The Book Sales Case Study

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- To create Category Dimension:

- create table Category
as select * from Cate



- To create Store Dimension:

- create table StoreDim
as select * from Store

- To create Time Dimension:

- create table TimeDim
as select distinct
to_char(SalesDate, 'YYYYMM') as TimeID,
to_char(SalesDate, 'MM') as Month,
to_char(SalesDate, 'YYYY') as Year
from Sales;

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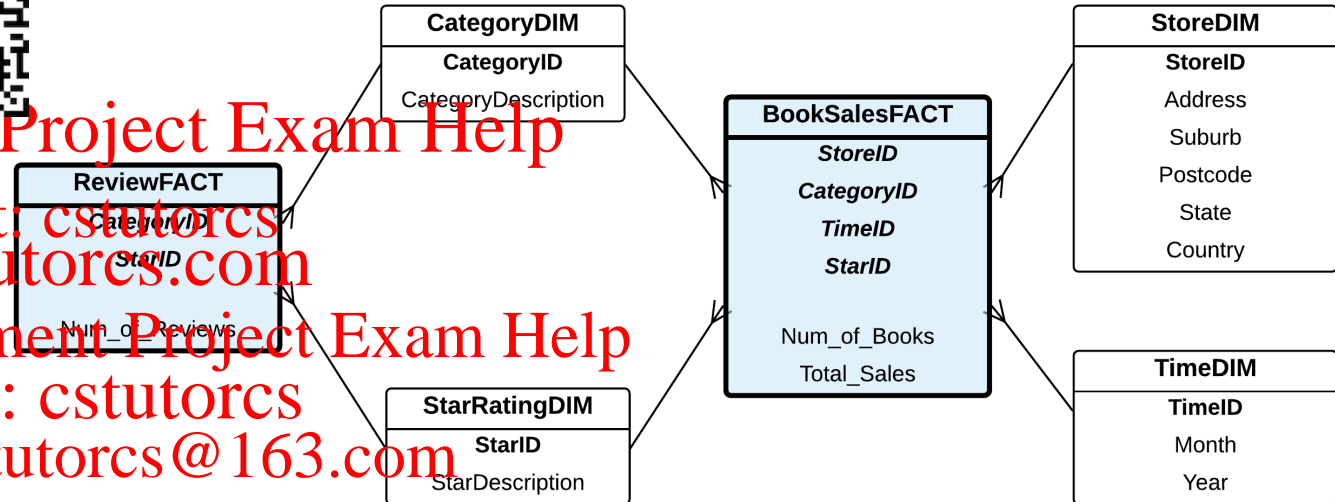
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- To create Star Rating Dimension

- create table StarRatingDim
(StarID number(1),
StarDescription varchar(255));



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- Inserting values to Star Rating Dimension:

- insert into StarRatingDim values (0, 'Unknown');
 - insert into StarRatingDim values (1, 'Poor');
 - insert into StarRatingDim values (2, 'Not Good');
 - insert into StarRatingDim values (3, 'Average');
 - insert into StarRatingDim values (4, 'Good');
 - insert into StarRatingDim values (5, 'Excellent');

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- To create Review Fact:

- create table ReviewFact
- ```
select
```

```
 B.CategoryID,
```

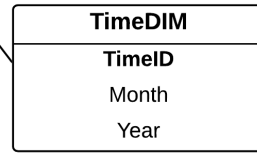
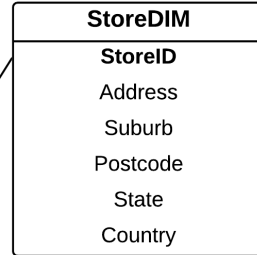
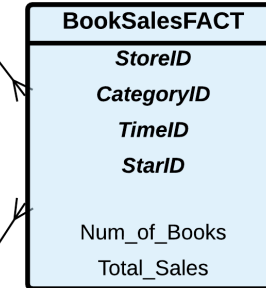
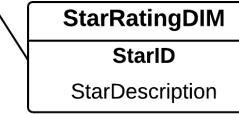
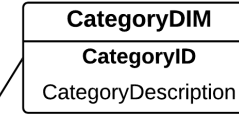
```
 R.Stars as StarID,
```

```
 count(*) as Num_of_Reviews
```

```
from Book5 B, Review5 R
```

```
where B.ISBN=R.ISBN
```

```
group by B.CategoryID, R.Stars;
```



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# The Book Sales Case Study

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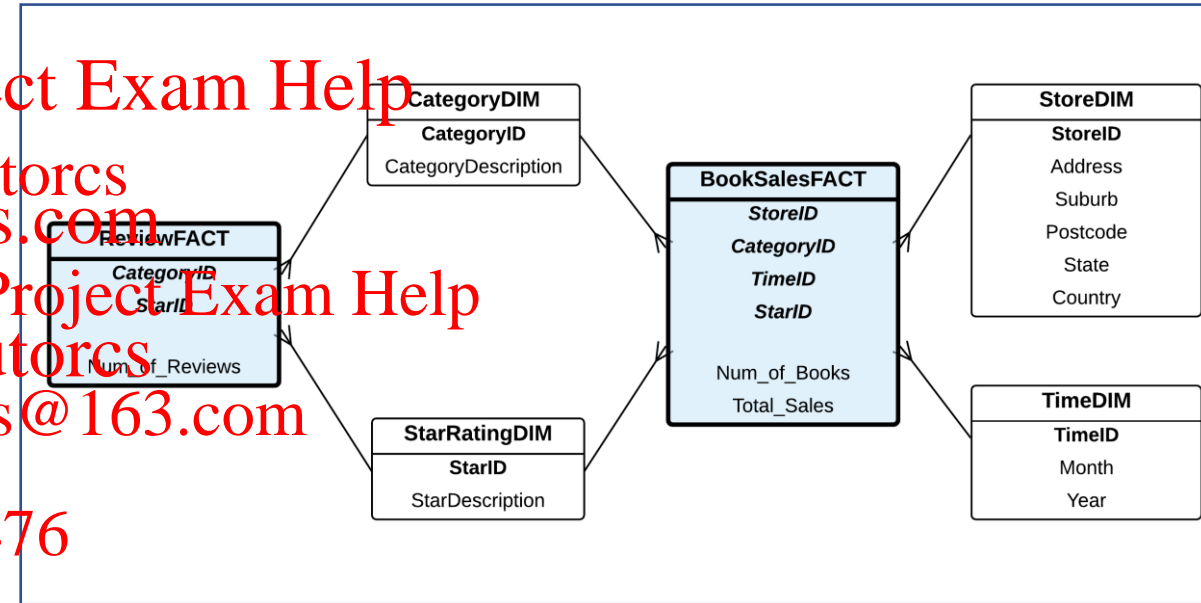
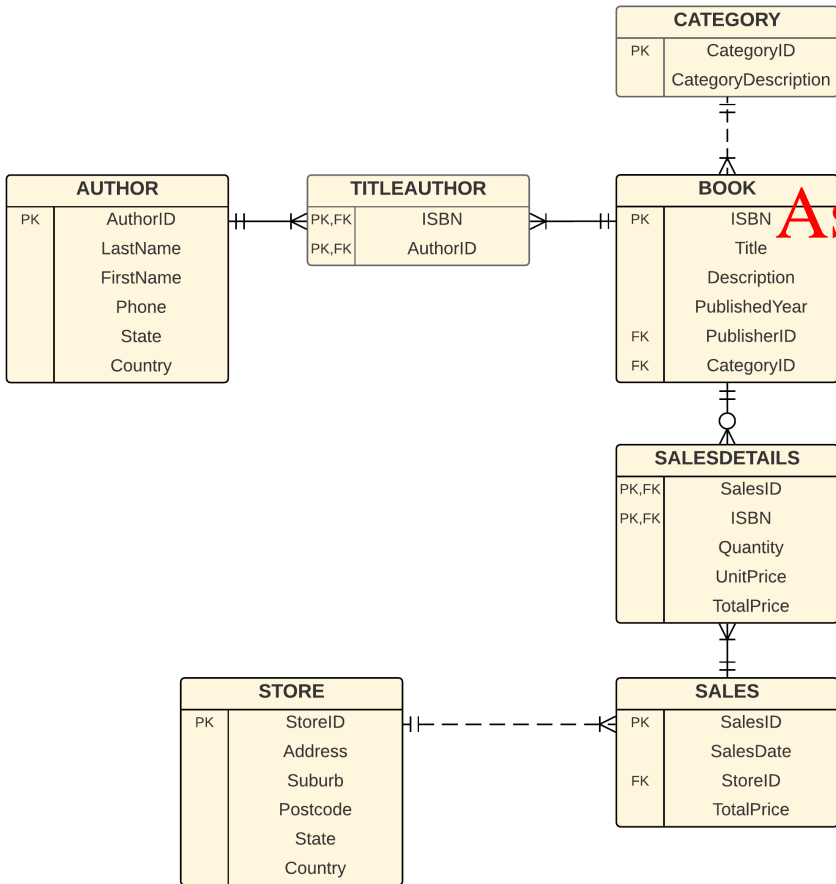
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# The Book Sales Case Study

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- To do an outer join between Book5 and Review5:

- create table TempBookWithStar as

```
select
 B.ISBN,
 B.CategoryID,
 nvl(R.Stars, 0) as Stars
from Book5 B, Review5 R
where B.ISBN = R.ISBN(+);
```



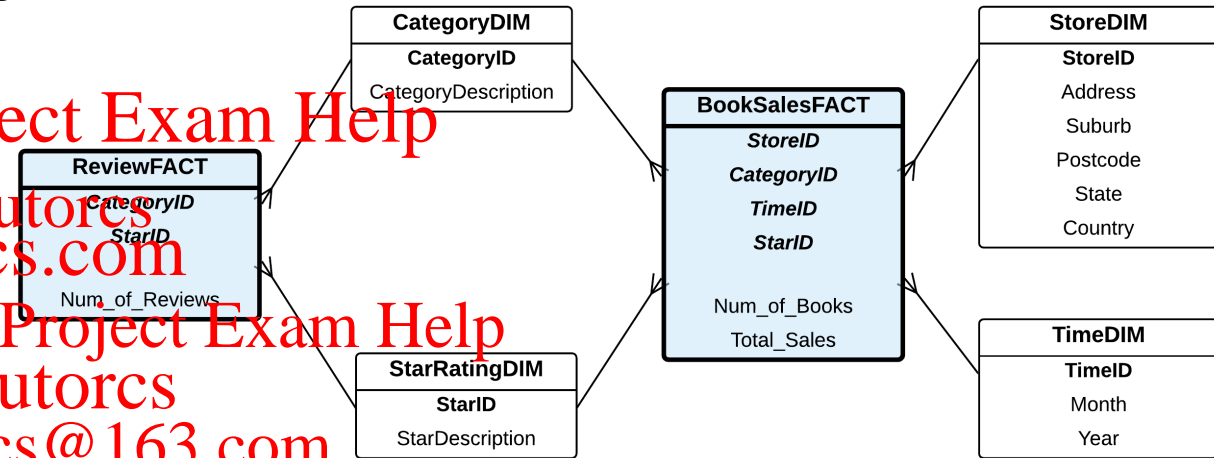
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- To calculate average stars:

- create table TempBookWithAvgStar as

```
select ISBN, CategoryID, round(avg(Stars)) as Avg_Stars
from TempBookWithStar
group by ISBN, CategoryID;
```

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# The Book Sales Case Study

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- To do an outer join between Book5 and Review5:

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from Book5 B, Review5 R
where B.ISBN = R.ISBN(+);
```



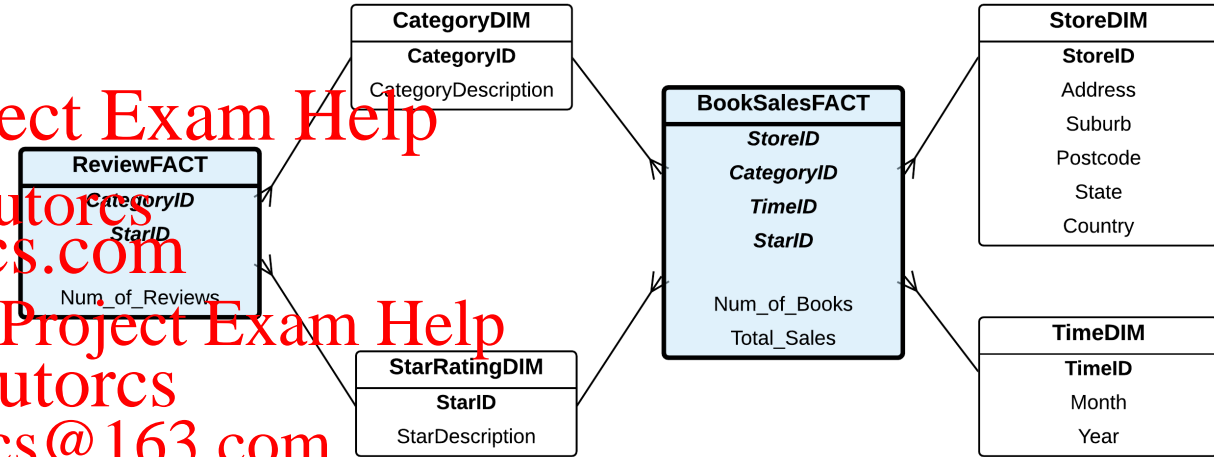
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- To calculate average stars:

- create table TempBookWithAvgStar as

```
select ISBN, CategoryID, round(avg(Stars)) as Avg_Stars
from TempBookWithStar
group by ISBN, CategoryID;
```

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# The Book Sales Case Study

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- To do an outer join between Book5 and Review5:

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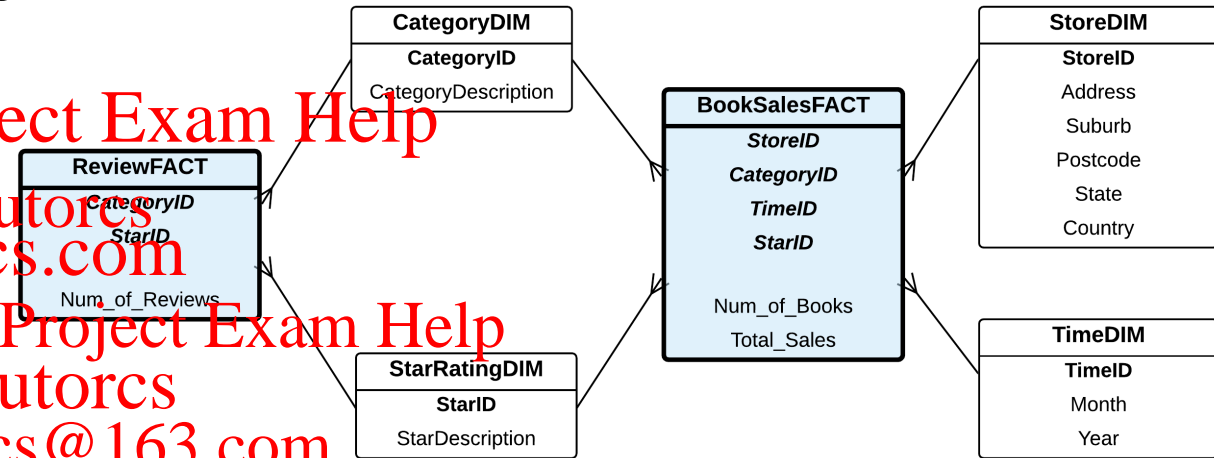
```
select
 B.ISBN,
 B.CategoryID,
 nvl(R.Stars, 0) as Stars
from Book5 B, Review5 R
where B.ISBN = R.ISBN(+);
```



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- To calculate average stars:

- create table TempBookWithAvgStar as

```
select ISBN, CategoryID, round(avg(Stars)) as Avg_Stars
from TempBookWithStar
group by ISBN, CategoryID;
```

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# The Book Sales Case Study

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- To do an outer join between Book5 and Review5:

- create table TempBookWithStar as

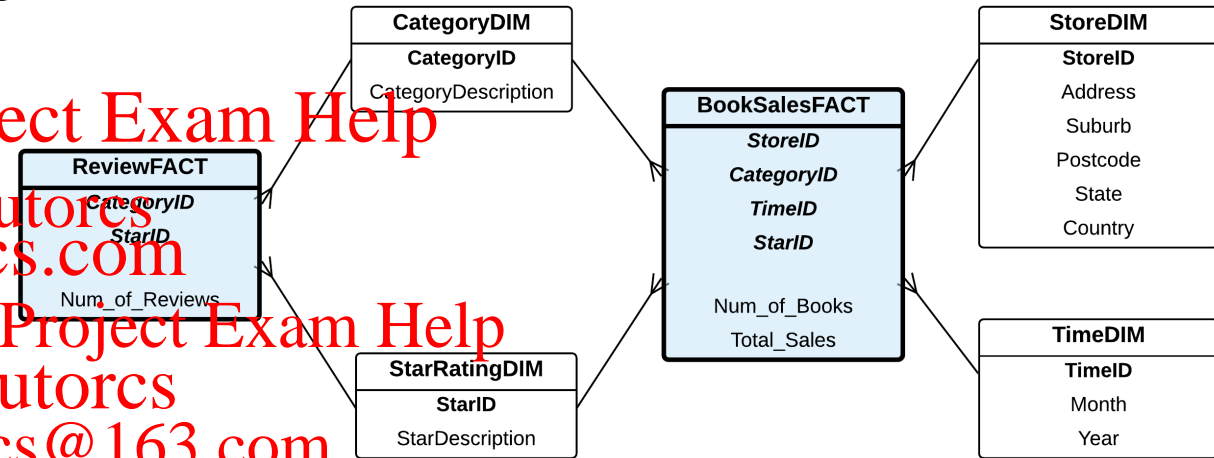
```
select
 B.ISBN,
 B.CategoryID,
 nvl(R.Stars, 0) as Stars
from Book5 B, Review5 R
where B.ISBN = R.ISBN(+);
```



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- To calculate average stars:

- create table TempBookWithAvgStar as

```
select ISBN, CategoryID, round(avg(Stars)) as Avg_Stars
from TempBookWithStar
group by ISBN, CategoryID;
```

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# The Book Sales Case Study

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- To create Book Sales Fact:

- create table BookSales

```
select T.CategoryID,
to_char(S.SalesDate, 'YYYYMM') as TimeID,
S.StoreID,
T.Avg_Stars as StarID,
sum(D.Quantity) as Num_of_Books,
sum(D.TotalPrice) as Total_Sales
from TempBookWithAvgStar T, Sales5 S, SalesDetails5 D
where T.ISBN = D.ISBN
and D.SalesID = S.SalesID
group by T.CategoryID, to_char(S.SalesDate, 'YYYYMM'), S.StoreID,
T.Avg_Stars;
```



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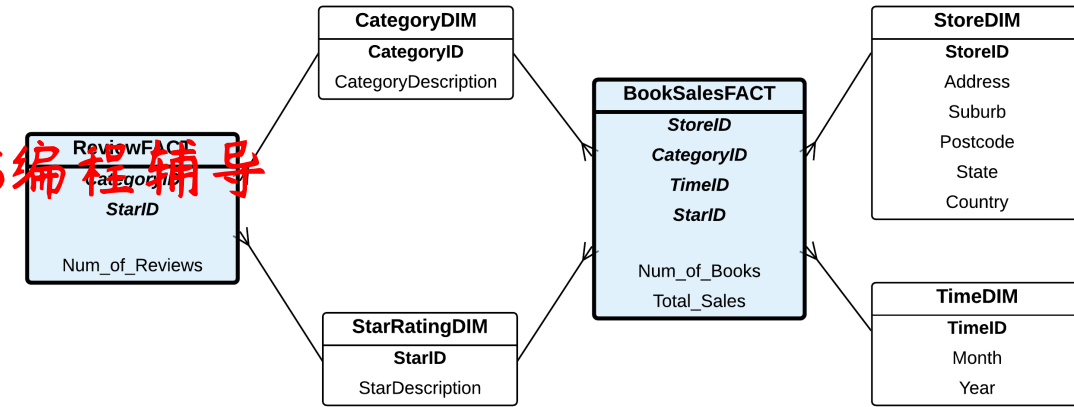
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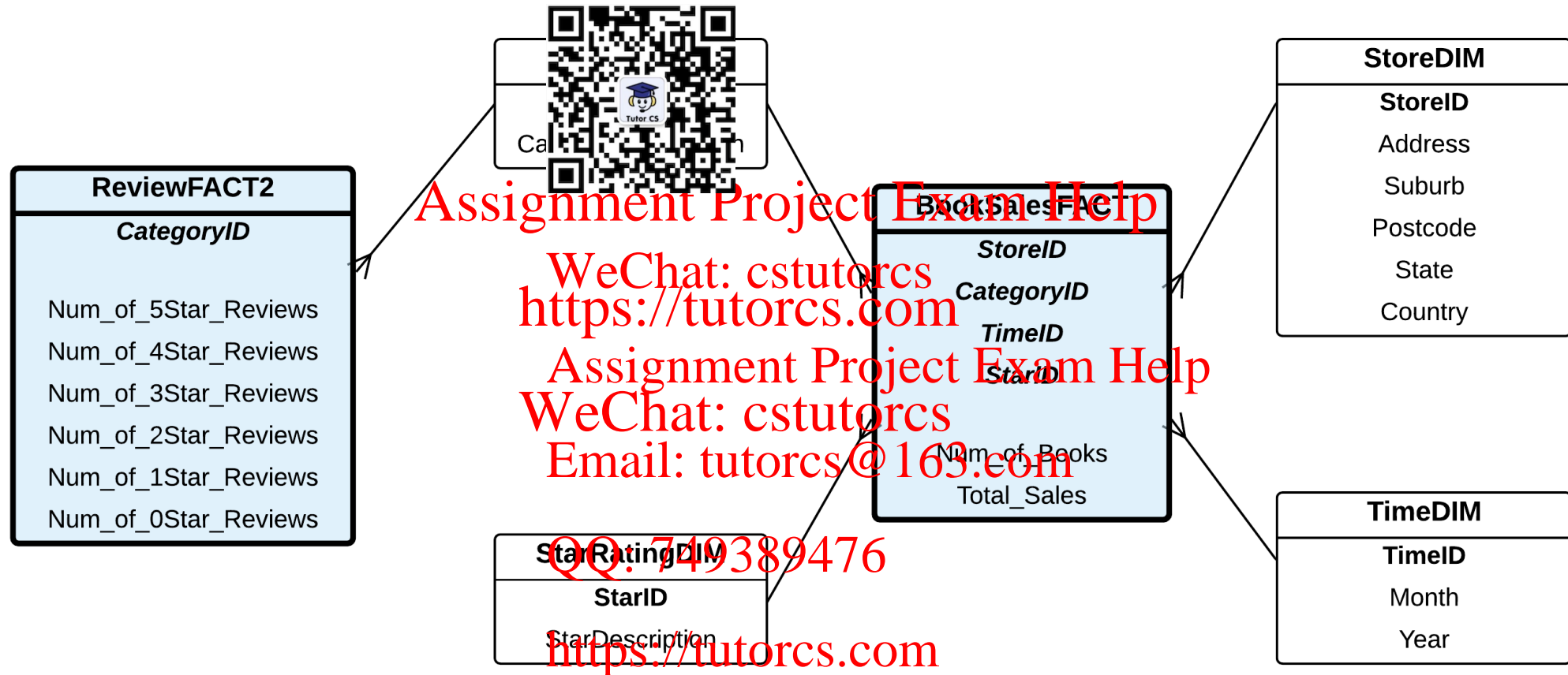
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# Multi-Fact with Pivot Table

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# Multi-Fact with Pivot Table

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- To create Review Fact with Pivot

- create table ReviewFact

```
select CategoryID,
```

```
 0 as Num_of_0Star_Reviews,
```

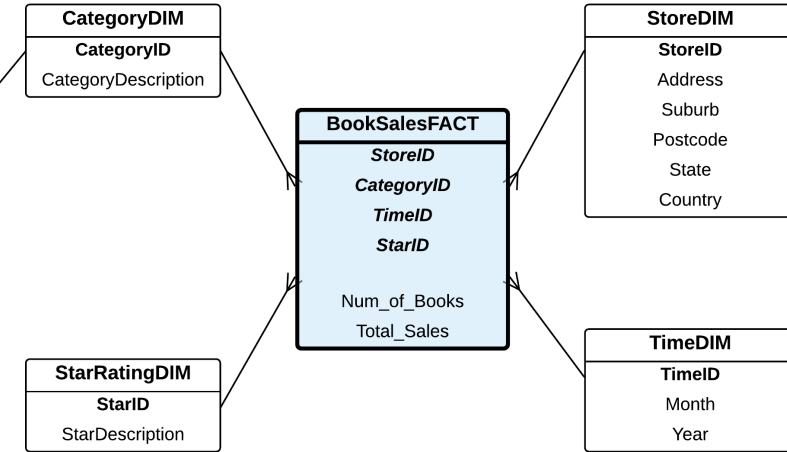
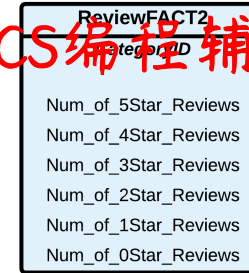
```
 0 as Num_of_1Star_Reviews,
```

```
 0 as Num_of_2Star_Reviews,
```

```
 0 as Num_of_3Star_Reviews,
```

```
 0 as Num_of_4Star_Reviews, 0 as Num_of_5Star_Reviews
```

```
from CategoryDim;
```



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# Multi-Fact with Pivot Table

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- Update rating value in Review Fact with

```
- update ReviewFact2 F2
set
```

```
Num_of_1Star_Reviews =
 nvl((select Num_of_Reviews
 from ReviewFact F1
 where F2.CategoryID = F1.CategoryID
 and F1.StarID = 1),0),
Num_of_2Star_Reviews =
 nvl((select Num_of_Reviews
 from ReviewFact F1
 where F2.CategoryID = F1.CategoryID
 and F1.StarID = 2),0),
Num_of_3Star_Reviews =
 nvl((select Num_of_Reviews
```



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```
from ReviewFact F1
where F2.CategoryID = F1.CategoryID
and F1.StarID = 3),0),
Num_of_4Star_Reviews =
 nvl((select Num_of_Reviews
 from ReviewFact F1
 where F2.CategoryID = F1.CategoryID
 and F1.StarID = 4),0),
Num_of_5Star_Reviews =
 nvl((select Num_of_Reviews
 from ReviewFact F1
 where F2.CategoryID = F1.CategoryID
 and F1.StarID = 5),0);
```

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# A Private Taxi Company Case Study

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A private taxi company is a small business. The owner of this company owns five cars, which can be chartered like a taxi. The business has many clients, and the number of clients grow due to word of mouth. When a client needs a service from this company (such as sending them from their home to the airport, or vice versa), they send a booking through an SMS or a chatting social media (e.g. WhatsApp). Once the booking is confirmed, a driver will pick the clients up and send them to the destination. The charges are normally a pre-defined fixed price, such as from an inner suburb of the city to the airport is \$90. The charge might be slightly more expensive than the normal taxi, but somehow many clients prefer the services that this company offer.

The company has three full-time drivers, including the owner himself, and five sessional or part-time drivers who may be called when the company needs drivers. Every time a client hires this taxi, the information (e.g. origin and destination, pickup time and date, fares, driver, car, distance travelled, amount of petrol used, etc) is recorded into their operational database.

# A Private Taxi Company Case

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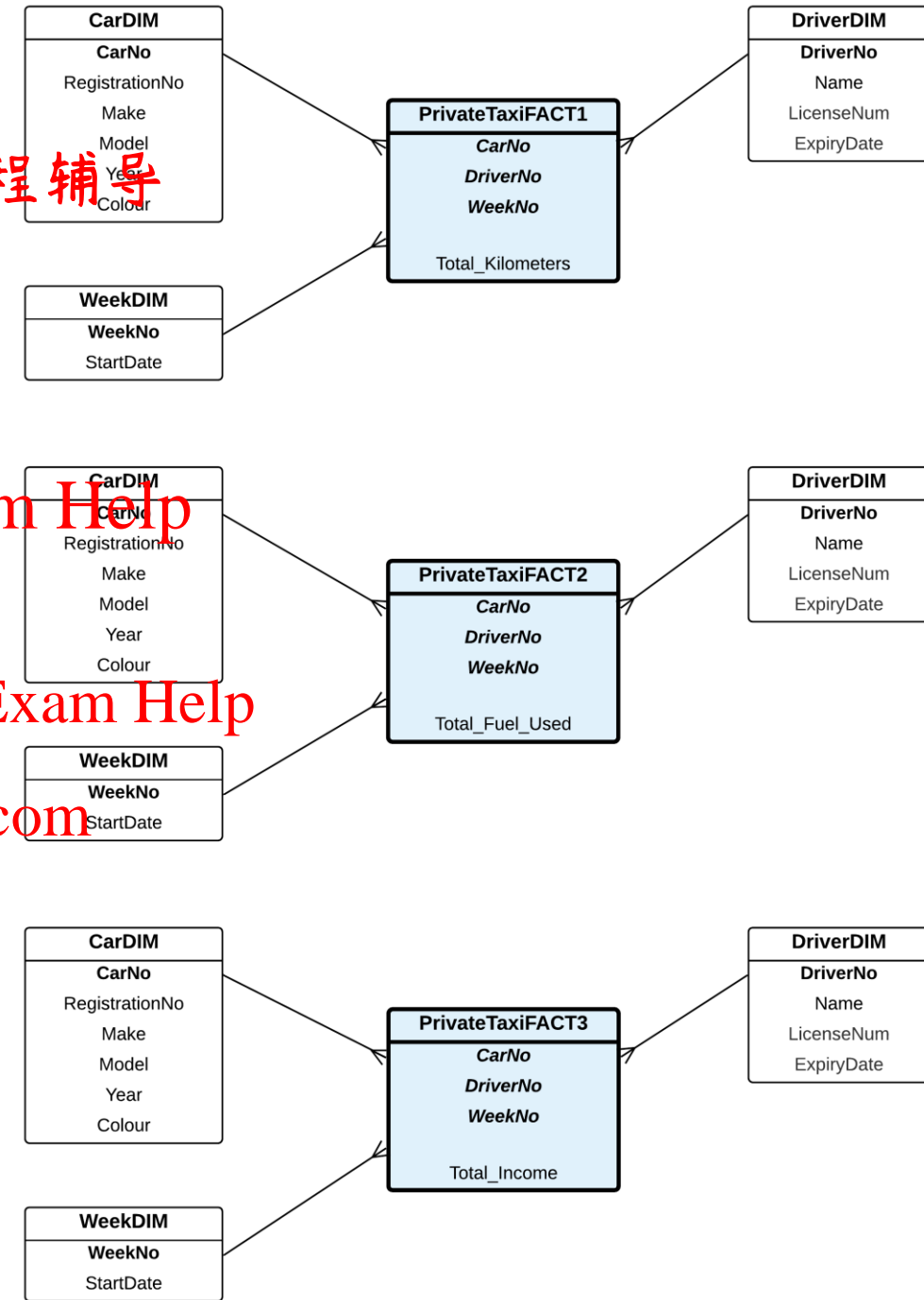
On top of this operational database, the company also builds a data warehouse for reporting purposes. The data warehouse is a star schema with only three dimensions: **Car dimension**, **Driver dimension**, and **Week dimension**. Basically the company would like to analyze their **total income**, **total kilometers traveled**, and **total fuel used**. These then become the fact measures of the star schema.



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# A Private Taxi Company Case Study

程序代写代做 CS编程辅导



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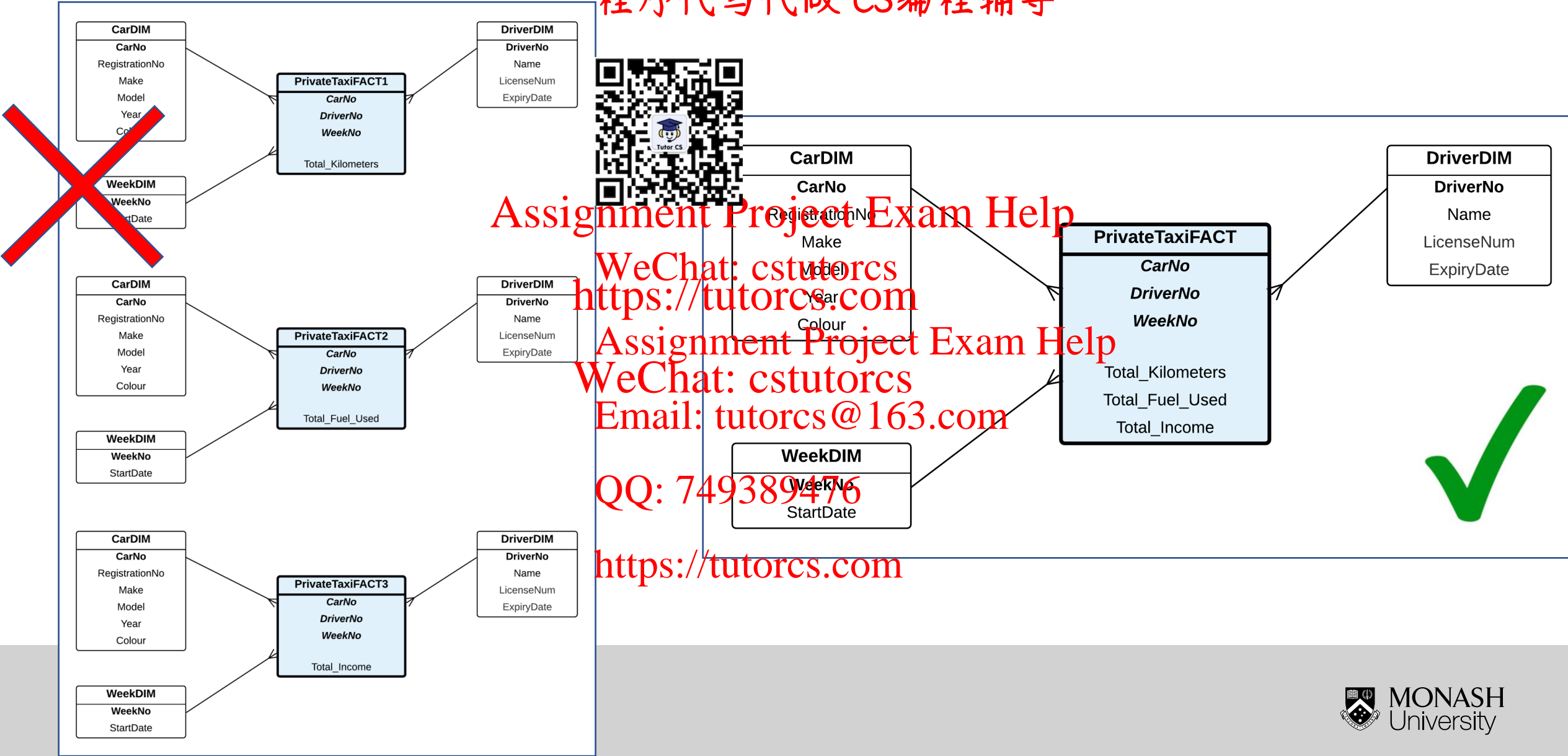
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Summary

# Summary

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- A Star Schema with Multi-Facts requires multiple Star Schemas are needed because each Fact focuses on a subject at a different granularity.
- Star schemas with different dimensions can be said to have different subjects.
- When multiple star schemas have different subjects (or different dimensions), they cannot be merged into one star schema.



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