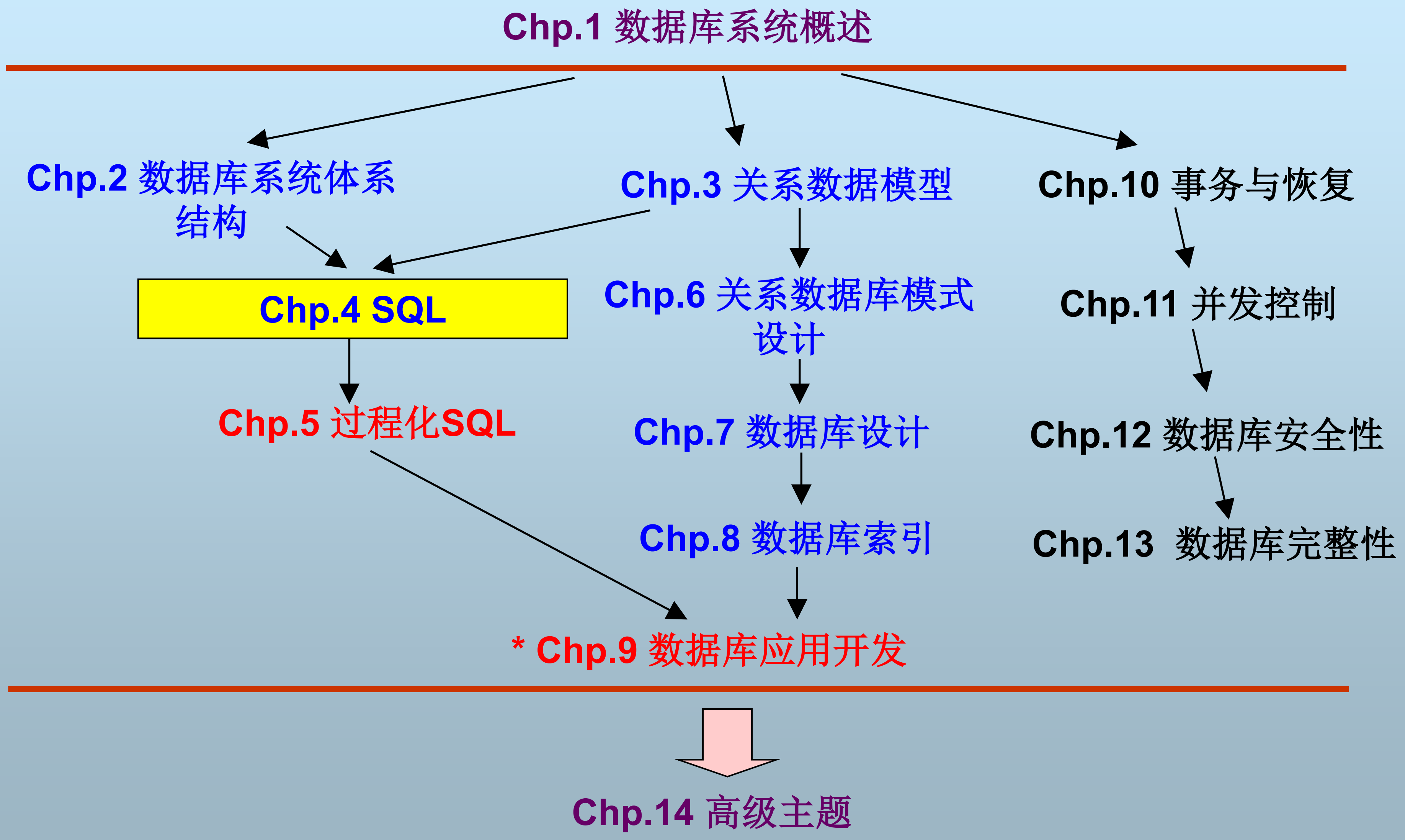
第4章 关系数据库语言SQL

课程知识结构



Chp.1 数据库系统概述

Chp.2 数据库系统体系结构

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Chp.4 SQL

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补充：再论Group By

- **Select语句后能否包含不在Group By中出现的列?**

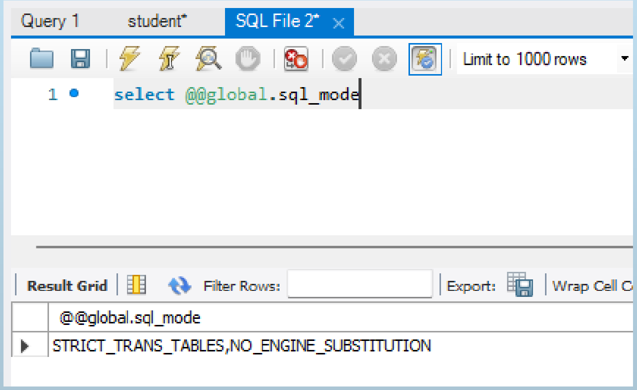
```
Select sname, count(cno) as c_count
From student, sc
Where student.sno=sc.sno
Group By student.sno;
```

```
Select sname, count(cno) as c_count
From student, sc
Where student.sno=sc.sno
Group By student.age;
```

- **Oracle和Microsoft SQL Server：NO！**

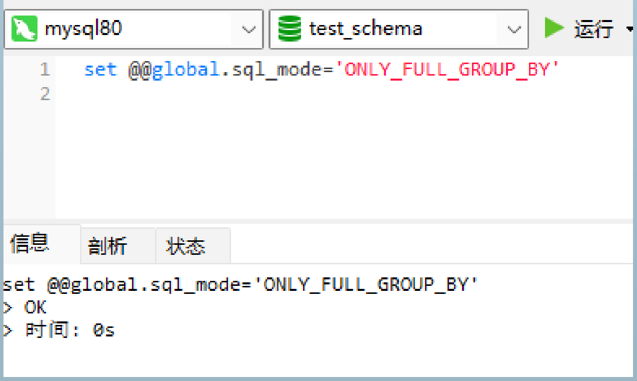
补充：再论Group By

- **Select语句后能否包含不在Group By中出现的列？**
  - **MySQL：取决于sql_mode是否配置了”ONLY_FULL_GROUP_BY”**
  - **同时还要满足：select后的分组属性函数依赖于group by后的属性**



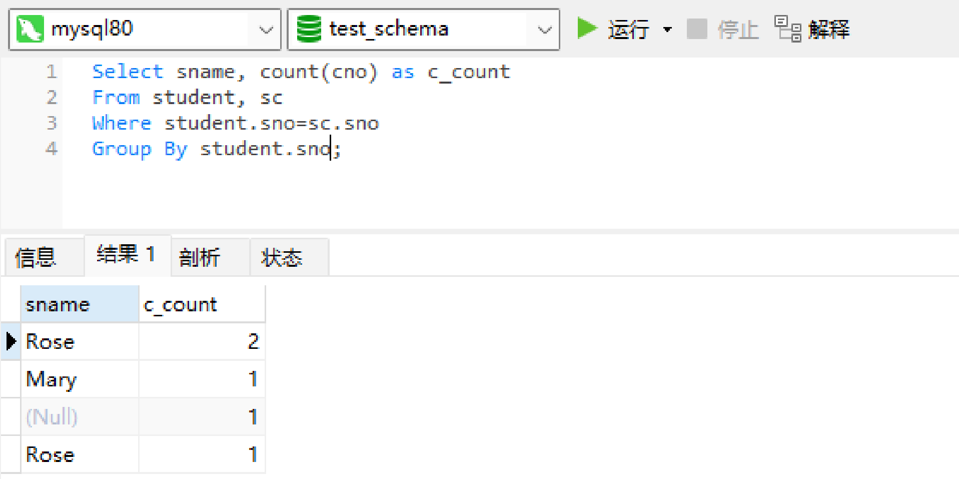
```sql
select @@global.sql_mode
```

```
@@global.sql_mode
STRICT_TRANS_TABLES,NO_ENGINE_SUBSTITUTION
```



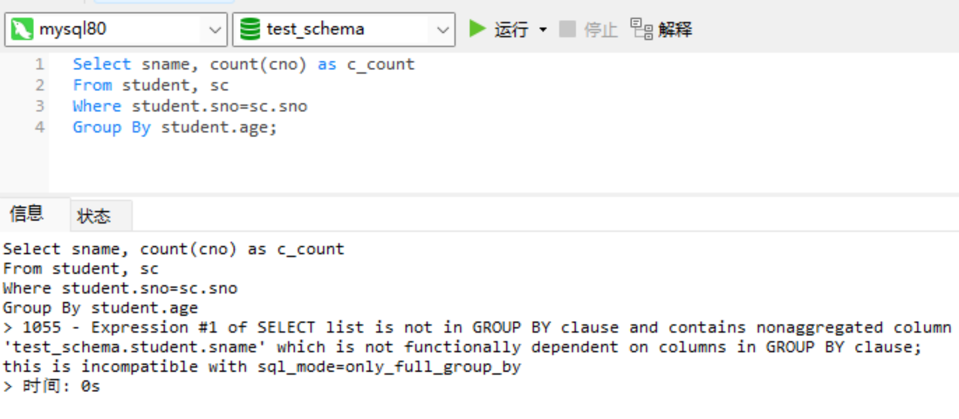
```sql
set @@global.sql_mode='ONLY_FULL_GROUP_BY'
```

```
set @@global.sql_mode='ONLY_FULL_GROUP_BY'
> OK
> 时间: 0s
```



```sql
Select sname, count(cno) as c_count
From student, sc
Where student.sno=sc.sno
Group By student.sno;
```

sname	c_count
Rose	2
Mary	1
(Null)	1
Rose	1



```sql
Select sname, count(cno) as c_count
From student, sc
Where student.sno=sc.sno
Group By student.age;
```

```
Select sname, count(cno) as c_count
From student, sc
Where student.sno=sc.sno
Group By student.age
> 1055 - Expression #1 of SELECT list is not in GROUP BY clause and contains nonaggregated column
'test_schema.student.sname' which is not functionally dependent on columns in GROUP BY clause;
this is incompatible with sql_mode=only_full_group_by
> 时间: 0s
```

补充：几个常用的特殊查询

- **Limit**
- **All，Some，Any**
- **Outer Join**

1、Limit

- Limit：限制返回前多少行 （MySQL Only）
- 返回平均成绩排前10的学生学号和平均成绩

```
Select sno, avg(score) as avg_score
From SC
Group By sno
Order By avg_score DESC
Limit 10
```

- 返回平均成绩排第5-10名的学生学号和平均成绩

```
Select sno, avg(score) as avg_score
From SC
Group By sno
Order By avg_score DESC
Limit 4,6  --从第5行开始，返回6行 offset, rows
```

2、All，Some，Any

- 查询工资比sales部门所有人都高的finance部门的员工
  - Select eno from employee where dept=‘finance’ and salary > ALL (select salary from employee where dept=‘sales’)
- All：要求子查询中的所有条件都满足
- Some和Any：要求子查询中的某个条件满足即可
  - Select eno from employee where dept=‘finance’ and salary > SOME (select salary from employee where dept=‘sales’)

3、Outer Join

- 传统自然连接一般称为Inner Join，即连接时只返回匹配的结果。但实际中有时需要同时返回不匹配的结果
- “求供应商的供应商号以及该供应商供应的平均零件数”

  -
    ```
    Select sno, avg(QTY) as avg_items
    From SPJ
    Group By sno
    ```
  - 如果要求没供应零件的供应商也需返回该怎么处理?

  -
    ```
    Select S.sno, avg(QTY) as avg_items
    From S LEFT OUTER JOIN SPJ on S.sno=SPJ.sno
    Group By S.sno
    ```

3、Outer Join

Sno	Sname	City
001	S1	HF
002	S2	BJ
003	S3	SH

S

Sno	Pno	QTY
001	C1	100
002	C2	300
001	C3	200
002	C1	500

SPJ

- **Left Outer Join**
  左外连接
  - 左边关系的所有元组都出现在结果关系中
  - 对于左边表的一条记录若与右边表有连接结果则直接输出连接结果；若没有连接结果，则除了左边表自己的字段外其余字段都为NULL
- **Select S.sno, avg(QTY) as avg_items**
  From S LEFT OUTER JOIN SPJ on S.sno=SPJ.sno
  Group By S.sno

S.sno	avg_items
001	150
002	400
003	

- **Right Outer Join**
- **Full Outer Join (MySQL不支持)**

补充：在select语句中使用if和case

- 输出每个同学的学号和选修课程数，要求如果没选课则输出选修课程数0
  - Select sno, count(cno) as c_count from SC group by sno
  - 问题：没选课的同学不会输出。解决方法：用left outer join
    - Select student.sno, count(cno) as c_count From student LEFT OUTER JOIN SC on student.sno=sc.sno Group by SC.sno
    - 下一个问题：没选课的同学输出的c_count是NULL
    - 如果想让没选课的输出数字0，解决方法：用if
    - Select student.sno,
      If(count(cno) is null, 0, count(cno)) as c_count
      From student LEFT OUTER JOIN SC on student.sno=sc.sno
      Group by SC.sno

If(条件表达式，true时的值，false时的值)

补充：在select语句中使用if和case

- 输出每个同学的学号和选修课程号与成绩，要求成绩按等级制输出，从E到A+

```
Select sno, cno
(Case
     when score>=95 then ’A+’
     when score>=90 and score<95 then ’A’
     when score>=85 and score<90 then ’A-’
     …
     Else ’E’
) as grade
From SC
```

- 通过case语句可以定制多样化输出

本章小结

- SQL数据库
- DDL:
  - Create Table/Alter Table/Drop Table
- DML
  - Insert, Delete, Update
  - Select: 基本查询、连接查询、嵌套查询
- View
  - 作用与优点、Create View/Drop View

本章小结

- Select <列名表> ——指定希望查看的列
  From <表名列表> ——指定要查询的表
  Where <条件> ——指定查询条件
  Group By <分组列名表> ——指定要分组的列
  　Having <条件> ——指定分组的条件
  Order By <排序列名表> ——指定如何排序