

实验3: 查询处理

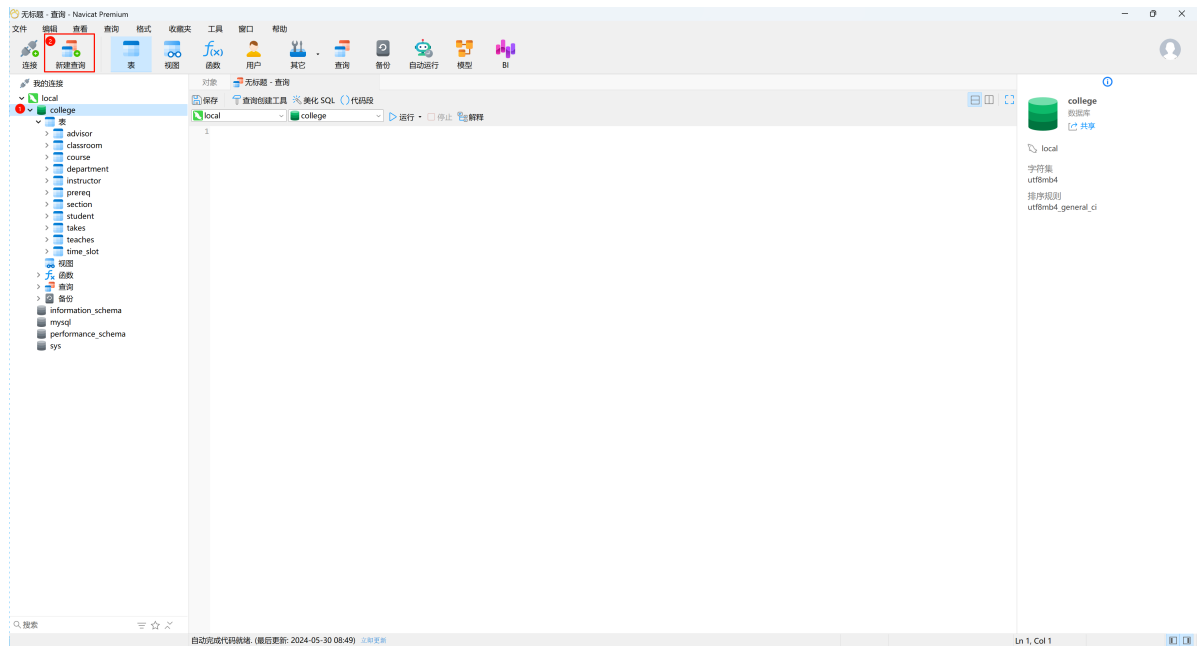
参考链接

- [MySQL 8.4 Reference Manual :: 15.8.2 EXPLAIN Statement](#)
- [MySQL 8.4 Reference Manual :: 10.8.2 EXPLAIN Output Format](#)

0. 环境准备

连接 实验2: JDBC 实验中使用的数据库college

方式1: 通过Navicat



方式2: 通过命令行

可能会比Navicat的结果展示效果更清晰

```
Windows PowerShell
Windows PowerShell
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安装最新的 PowerShell，了解新功能和改进！https://aka.ms/PSWindows

PS C:\Users\busyl> mysql -uroot -p
Enter password: *****
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 15
Server version: 8.4.0 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use college;
Database changed
mysql> explain SELECT title FROM course ORDER BY title, credits;
+----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| id | select_type | table | partitions | type | possible_keys | key | key_len | ref | rows | filtered | Extra |
+----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | SIMPLE | course | NULL | ALL | NULL | NULL | NULL | NULL | 200 | 100.00 | Using filesort |
+----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 row in set, 1 warning (0.00 sec)

mysql> explain FORMAT=TREE SELECT title FROM course ORDER BY title, credits;
+-----+
| EXPLAIN |
+-----+
| -> Sort: course.title, course.credits (cost=20.2 rows=200) |
| -> Table scan on course (cost=20.2 rows=200) |
| |
+-----+
1 row in set (0.00 sec)
```

1. 执行计划查询和解释

1. 执行以下语句，获取并解释该查询执行计划

```
explain SELECT title FROM course ORDER BY title, credits;

explain analyze SELECT title FROM course ORDER BY title, credits;

explain analyze SELECT title FROM course ORDER BY title, credits;
```

建议尝试执行 `FORMAT=TREE/JSON` 来获取更清晰和详细的分析结果

对于第一行代码，可以尝试下面两条语句

```
explain SELECT FORMAT=TREE title FROM course ORDER BY title, credits;
explain SELECT FORMAT=JSON title FROM course ORDER BY title, credits;
```

另外，输出结果的含义可以参考：[MySQL 8.4 Reference Manual :: 10.8.2 EXPLAIN Output Format](#)

2. 执行以下语句，获取并解释该查询执行计划

```
explain SELECT T1.name FROM student AS T1
          JOIN advisor AS T2 ON T1.id = T2.s_id
          GROUP BY T2.s_id HAVING count(*) > 1;

explain analyze SELECT T1.name FROM student AS T1
          JOIN advisor AS T2 ON T1.id = T2.s_id
          GROUP BY T2.s_id HAVING count(*) > 1;

explain analyze SELECT T1.name FROM student AS T1
          JOIN advisor AS T2 ON T1.id = T2.s_id
          GROUP BY T2.s_id HAVING count(*) > 1;
```

3. 执行以下语句，获取并解释该查询执行计划

```
explain SELECT title FROM course WHERE course_id IN
(SELECT T1.prereq_id FROM prereq AS T1
  JOIN course AS T2 ON T1.course_id = T2.course_id
  WHERE T2.title = 'Mobile Computing');

explain analyze SELECT title FROM course WHERE course_id IN
(SELECT T1.prereq_id FROM prereq AS T1
  JOIN course AS T2 ON T1.course_id = T2.course_id
  WHERE T2.title = 'Mobile Computing');

explain analyze SELECT title FROM course WHERE course_id IN
(SELECT T1.prereq_id FROM prereq AS T1
  JOIN course AS T2 ON T1.course_id = T2.course_id
  WHERE T2.title = 'Mobile Computing');
```

4.执行以下语句，获取并解释该查询执行计划

```
explain SELECT dept_name, building FROM department
        WHERE budget > (SELECT avg(budget) FROM department);
explain analyze SELECT dept_name, building FROM department
        WHERE budget > (SELECT avg(budget) FROM department);
explain analyze SELECT dept_name, building FROM department
        WHERE budget > (SELECT avg(budget) FROM department);
```

2. 项目查询分析

本任务针对 实验2: JDBC 中的小项目

对实验2中的小项目作业中涉及的SQL查询语句，使用**EXPLAN**语句进行分析：

1. 画出查询计划树，说明每个节点的功能和执行时间信息
2. 说明该执行计划是否为最优的
3. 针对可能出现的性能问题，提出解决方案。（若为最优的，尝试做一个较差的执行方案并说明性能差距出现的原因）