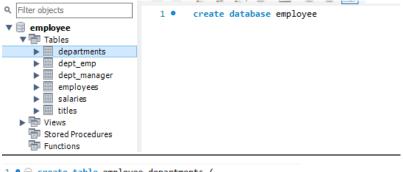
实验一结果截图

一、实验截图

(注意截图清晰,包含完整的sal 语句和运行结果)

创建数据库和创建表格



```
1 ● ⊖ create table employee.departments (
2 dept. no. char (4).
Open a script file in this editor
      dept_name varchar(40) not null,
      primary key(dept_no),
4
5
      unique key(dept_name)
6
      );
8 • ⊝ create table employee.dept_emp (
9
      emp_no int not null,
LØ
      dept_no char(4) not null,
      from_date date not null,
11
      to_date date not null,
12
      primary key(emp_no, dept_no)
13
     );
14
15
L7
       emp_no int not null,
18
      dept_no char(4) not null,
L9
      from_date date not null,
20
      to_date date not null,
21
      primary key(emp_no, dept_no)
22
23
24 • ⊖ create table employee.employees (
25
       emp_no int not null,
       birth date date not null,
26
      first name varchar(14) not null,
27
28
      last_name varchar(16) not null,
      gender enum('M','F') not null,
29
30
      hire_date date not null,
      primary key(emp_no)
31
32
      );
33
34 • ⊝ create table employee.salaries (
      emp_no int not null,
35
36
      salary int not null,
      from_date date not null,
37
      to date date not null.
```

```
34 • ⊝ create table employee.salaries (
         emp_no int not null,
35
         salary int not null,
36
         from_date date not null,
37
         to_date date not null,
38
         primary key(emp_no, from_date)
39
40
         );
41
42 • ⊖ create table employee.titles (
43
         emp_no int not null,
         title varchar(50) not null,
44
         from_date date not null,
45
         to_date date,
46
47
         primary key(emp_no, title, from_date)
48
                         departments
               Table Name:
                                           Schema: employee
                         utf8mb ∨ utf8mb ∨
           Charset/Collation:
                                                  InnoDB
                                           Engine:
            Comments:
Column Name
                         Datatype
                                              NN
                                                  UQ
                                                      В
                                                          UN
                        CHAR(4)
                                         ~
                                             ~
dept_no
                                              ~
                                                  ~
dept_name
                        VARCHAR(40)
                        dept_emp
               Table Name:
                                          Schema: employee
                        utf8mb ∨ utf8mb ∨
           Charset/Collation:
            Comments:
Column Name
                        Datatype
                                                 UQ
                                                     В
                                                         UN
                                        💡 emp_no
                                             🕴 dept_no
                        CHAR(4)
from_date
                        DATE
 to_date
                        DATE
```

	Table Name:	dept_mana	ger	Schema:	employee	
	Charset/Collation:	utf8mŁ ∨	utf8mb ∨	Engine:	InnoDB	
	Comments:					
Column Name remp_no dept_no from_date to_date	2	Datatype INT CHAR(4) DATE DATE		PK NN	UQ B UN	[[[[
37	Table Name:	employees		Schema:	employee	
	Charset/Collation:	utf8mt ∨	utf8mb ∨	Engine:	InnoDB	
	Comments:					
Column Name		Datatype		PK NN	UQ B UN	
emp_no		INT				
birth_date		DATE				
first_name		VARCHAR(14	•			
last_name		VARCHAR(16	•			
gender		ENUM('M', 'F'))		H H	
hire_date		DATE			<u> </u>	
	Table Name: Charset/Collation:	salaries	utf8mb ∨	Schema: Engine:	employee InnoDB	
	Comments:					_
Column Name		Datatype				Z
emp_no		INT				=
salary		INT				=
from_date		DATE			_	=
to_date		DATE			닉 님 님 ¦	=
						_

1 C	31	Table Name:	titles	Sd	nema:	employee			
		Charset/Collation:	utf8mb \vee utf8mb \vee	En	gine:	Inno	DB		
		Comments:							
	Column Name		Datatype	PK	NN	UQ	В	UN	Z
	emp_no		INT	~	~				
	🕴 title		VARCHAR(50)	~	~				
	🕴 from_date		DATE	~	~				
	to_date		DATE						
ı				1 1	1 1	1	1 1		

完成 14 道题目

<u>1.</u>

```
1 •
      SELECT e.emp_no,
      birth_date,
2
             first_name,
 3
 4
             last_name,
 5
             gender,
 6
             hire_date,
             title
     FROM employee.employees e,
 8
9
             employee.titles t
    WHERE e.emp_no = 10029
10
            AND e.emp_no = t.emp_no;
11
```



0.000 sec / 0.000 sec

<u>2.</u>

```
SELECT first name, last name
   1 •
          FROM
                    employee.employees e,
   2
   3
                    employee.departments d,
   4
                    employee.dept_emp de
                    e.hire_date > 1990-01-01
   5
          WHERE
                    AND d.dept_name = 'Finance'
   6
   7
                    AND e.gender = 'M'
   8
                    AND e.emp_no = de.emp_no
   9
                    AND d.dept_no = de.dept_no;
                                                 Export: Wrap Cell Content: IA
first_name
                last_name
   Yinghua
               Dredge
   Premal
               Baek
               Skrikant
   Ayakannu
   Marla
               Brendel
   Chenyi
               Syang
   Kazuhito
               Encarnacion
   Miyeon
               Macedo
               Mahmud
   Shrikanth
   Pragnesh
               Iisaka
   Shaw
               Wendorf
   Shigehito
               Kropatsch
   Marc
               Hellwagner
   Ortrud
               Murillo
   Takahiro
               Waterhouse
   Yishai
               Cannane
               Velardi
   Kristine
                                                                                   Execution Plan
               Staudhammer
   Lucien
               Kusakari
   Moto
   Uli
               Keustermans
   Ennio
               Trogemann
   Gretta
   Lein
               Lichtman
   Xiaogiu
               Krychniak
   Subbu
               Sanella
   Keung
               Delgrande
Result 2 ×
                                                                               Read O
Output :::::
Action Output
         Time
                  Action
                                                                Message
    157 12:39:59 SELECT * FROM employee.departments LIMIT 0, 10... 10 row(s) returned
    158 12:46:01 SELECT e.emp_no, birth_date,
                                                first_name, last... 2 row(s) returned
    159 12:47:29 SELECT first_name, last_name FROM employee.emp... 39 row(s) returned
```

```
1 •
        SELECT DISTINCT e.emp_no,
                          birth_date,
 2
                          first_name,
 3
                          last_name,
 4
 5
                          gender,
                          hire_date
 6
        FROM
                 employee.departments d,
 7
                 employee.dept_emp de,
 8
                 employee.employees e
 9
10
        WHERE
                 e.first_name like 'Ge%'
                 AND e.emp_no not in (
11
                      SELECT de.emp_no
12
13
                      FROM
                              employee.departments d,
                              employee.dept_emp de
14
                              d.dept_name = 'Production'
15
                     WHERE
16
                              AND d.dept no = de.dept no);
tesult Grid
             Filter Rows:
                                           Export: Wrap Cell Co
           birth_date
                      first_name
                                                   hire_date
  emp_no
                                 last_name
                                           gender
                                                   1986-06-26
  10001
          1953-09-02
                      Georgi
                                Facello
  10055
          1956-06-06
                      Georgy
                                Dredge
                                           М
                                                   1992-04-27
  10219
          1952-05-02
                      Genta
                                Kolvik
                                                   1993-03-31
```

160 12:47:55 SELECT DISTINCT e.emp_no, birth_date, first_name... 3 row(s) returned

0.015 sec / 0.000 sec

<u>4.</u>

```
1 •
          SELECT e.emp no,
   2
                    birth_date,
   3
                    first_name,
   4
                    last_name,
   5
                    gender,
                    hire date
   6
   7
                    employee.employees e
           FROM
   8
                    e.first name in (

    WHERE

   9
               SELECT first_name
  10
               FROM
                         employee.employees e
               GROUP BY e.first name HAVING COUNT(*)>3
  11
               )
  12
  13
          ORDER BY e.first_name ASC;
<
 Result Grid
                Filter Rows:
                                                Edit: 🍊 🖶 🖶 Export/Import:
             birth_date
                          first_name
                                                gender
                                                        hire_date
    emp_no
                                     last_name
             1957-10-05
                                                        1991-05-01
    10162
                         Florina
                                    Eugenio
    10681
             1964-12-25
                                                        1992-10-25
                         Florina
                                    Garnier
                                               Μ
    10757
             1961-01-11
                         Florina
                                    Simkin
                                               М
                                                        1986-01-06
            1963-01-01
                                               F
    10850
                         Florina
                                    Schapire
                                                        1990-04-22
    10031
             1959-01-27
                         Karsten
                                    Joslin
                                                        1991-09-01
    10163
             1952-09-17
                         Karsten
                                    Szmurlo
                                                        1989-07-19
             1964-05-11
    10611
                                    Blokdijk
                                               М
                                                        1989-09-16
                         Karsten
    110228 1958-12-02 Karsten
                                    Sigstam
                                               F
                                                        1985-08-04
                                    Ciolek
    10214
             1962-04-14
                         Tadahiko
                                                        1988-02-29
                                               м
    10300
             1960-07-12
                         Tadahiko
                                    Ulupinar
                                               F
                                                        1991-05-17
                                    Strehl
    10351
             1963-08-23
                         Tadahiko
                                                        1985-03-07
          1954-05-27
                                                        1988-07-30
    10791
                         Tadahiko
                                    Sgarro
                                               М
    10339
             1957-08-27
                                    Liedekerke
                                                        1989-11-30
                         Teunis
                                               М
    10663
             1965-01-09
                         Teunis
                                    Noriega
                                               М
                                                        1993-01-23
    10794
             1962-06-26
                         Teunis
                                    Berztiss
                                                        1992-03-29
                                    Kleiser
    10884
          1958-03-07
                                               F
                                                        1993-04-15
                        Teunis
    10525
             1963-03-29
                         Yuchang
                                    Lunt
                                                        1990-07-08
    10748
             1964-04-12
                         Yuchang
                                    Francisci
                                               F
                                                        1990-08-14
    10800
             1961-12-15
                         Yuchang
                                    Matzke
                                                        1993-05-20
   111939
                         Yuchang
             1960-03-25
                                    Weedman
                                               м
                                                        1989-07-10
   NULL
                                    NULL
employees 7 x
Output
Action Output
         Time
                  Action
                                                               Message
     159 12:47:29 SELECT first_name, last_name FROM employee.emp... 39 row(s) returned
     160 12:47:55 SELECT DISTINCT e.emp_no, birth_date, first_name... 3 row(s) returned
                                               first_name,
     161 12:48:38 SELECT e.emp_no, birth_date,
Ø
                                                           ... 20 row(s) returned
```

```
1 •
         SELECT de.emp no
  2
         FROM
                  employee.dept_emp de,
                  employee.departments d
  3
                  d.dept_name = 'Production'
  4
         WHERE
  5
                  AND de.emp_no in (
                       SELECT de.emp_no
  6
                                employee.dept_emp de,
  7
                       FROM
                                employee.departments d
  8
                               d.dept_name = 'Quality Management'
  9
                       WHERE
                                AND d.dept_no = de.dept_no
 10
                       )
 11
                  AND d.dept no = de.dept no;
 12
                                             Export: Wrap Cell Content: IA
emp_no
   10010
   10029
   10124
   10192
   10200
   10307
   10344
   10363
   10392
   10422
   10786
   10874

    162 12:49:24 SELECT de.emp_no FROM employee.dept_emp de, ... 12 row(s) returned

                                                                           0.000 sec / 0.000 sec
6.
   1 •
          SELECT count(DISTINCT de.emp_no)
   2
          FROM
                   employee.dept emp de
                   de.emp_no in (
   3

    WHERE

   4
                        SELECT de.emp no
                        FROM employee.dept emp de
   5
                        GROUP BY de.emp no HAVING COUNT(*)>=2
   6
   7
                        );
 Export: Wrap Cell Content
     count(DISTINCT
     de.emp_no)
   94
                                                                           0.000 sec / 0.000 sec
163 12:50:16 SELECT count(DISTINCT de.emp_no) FROMemploy... 1 row(s) returned
```

```
<u>7.</u>
           SELECT de.emp_no, MAX(salary)
    2
           FROM
                    employee.salaries s,
                    employee.dept_emp de
    3
                    de.dept no = 'd003'
           WHERE
    4
                    AND s.emp_no = de.emp_no
    5
<
  Ex
              MAX(salary)
     emp_no
    10005
             96471

    164 12:50:36 SELECT de.emp_no, MAX(salary) FROMemployee.s... 1 row(s) returned

                                                                           0.015 sec / 0.000 sec
<u>8.</u>
    1 •
           SELECT first_name, last_name
                    employee.employees e,
    2
           FROM
    3
                    employee.dept_manager dm
                    dm.to_date > NOW()
    4
           WHERE
                    AND dm.dept no = 'd002'
    5
                    AND e.emp_no = dm.emp_no
    6
 Result Grid
                 Filter Rows:
                                               Export
```

0.015 sec / 0.000 sec

<u>9.</u>

first_name

Isamu

last_name

Legleitner

```
SELECT de.dept no, SUM(s.salary)
   1 •
                   employee.dept_emp de,
   2
          FROM
                   employee.salaries s
   3
                   de.to_date > NOW()
   4
          WHERE
   5
                   AND s.to_date > NOW()
                   AND de.emp_no = s.emp_no
   6
   7
          GROUP BY de.dept_no
Result Grid
               Filter Rows:
    dept_no
             SUM(s.salary)
   d005
             12842935
   d007
             10310030
   d004
             11799882
   d003
            2814474
   d008
             3632343
   d006
            3321837
   d001
             2492789
   d009
            3775363
   d002
             2949661

    166 12:51:55 SELECT de.dept_no, SUM(s.salary) FROMemployee.... 9 row(s) returned

                                                                              0.015 sec / 0.000 sec
<u>10.</u>
   1 •
          SELECT d.dept_no, d.dept_name, AVG(salary)
   2
          FROM
                    employee.departments d,
                    employee.dept_emp de,
   3
                    employee.salaries s
   4
                   de.to date > NOW()
   5
          WHERE
                    AND s.to date > NOW()
   6
   7
                    AND de.emp_no = s.emp_no
                    AND de.dept_no = d.dept_no
   8
          GROUP BY de.dept no
   9
               HAVING AVG(salary)>=70000 AND AVG(salary)<80000;
  10
  11
                                               Export: Wrap Cell Conte
dept_no
             dept_name
                         AVG(salary)
  d002
             Finance
                         77622.6579
167 12:52:36 SELECT d.dept_no, d.dept_name, AVG(salary) FRO... 1 row(s) returned
                                                                              0.000 sec / 0.000 sec
```

```
INSERT INTO employee.departments (dept_no, dept_name)
VALUES('d180', 'computer');

INSERT INTO employee.departments(dept_no, dept_name)
VALUES('d110', 'science');

173 12:55:01 INSERT INTO employee.departments (dept_no, dept... 1 row(s) affected 0.015 sec
174 12:55:01 INSERT INTO employee.departments(dept_no, dept... 1 row(s) affected 0.000 sec
```

	dept_no	dept_name
•	d001	Marketing
	d002	Finance
	d003	Human Resources
	d004	Production
	d005	Development
	d006	Quality Management
	d007	Sales
	d008	Research
	d009	Customer Service
	d110	science
	d180	computer
	NULL	NULL

<u>12.</u>

```
DELETE FROM employee.departments

WHERE dept_no = 'd180'

AND dept_name = 'computer';
```

176 12:57:50 DELETE FROM employee.departments WHERE dep... 1 row(s) affected

0.000 sec

	dept_no	dept_name
•	d009	Customer Service
	d005	Development
	d002	Finance
	d003	Human Resources
	d001	Marketing
	d004	Production
	d006	Quality Management
	d008	Research
	d007	Sales
	d110	science
	NULL	NULL

```
1    UPDATE employee.departments
2    SET dept_name = 'computer science'
3    WHERE dept_no = 'd110'
```

178 12:58:34 UPDATE employee.departments SET dept_name = '... 1 row(s) affected Rows matched: 1 Changed: 1 Wa... 0.015 sec

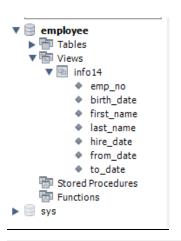
	dept_no	dept_name
•	d110	computer science
	d009	Customer Service
	d005	Development
	d002	Finance
	d003	Human Resources
	d001	Marketing
	d004	Production
	d006	Quality Management
	d008	Research
	d007	Sales
	NULL	NULL

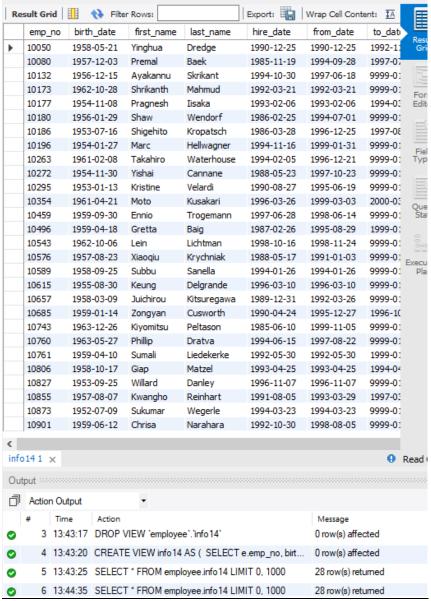
<u>14.</u>

```
1 • ⊖ CREATE VIEW info14 AS (
           SELECT e.emp_no,
 2
                    birth_date,
 3
                    first name,
 4
 5
                    last_name,
                    hire_date,
 6
                    de.from_date,
 7
                    de.to_date
 8
                    employee.employees e,
           FROM
 9
10
                    employee.dept_emp de,
                    employee.departments d
11
                    de.from_date >= '1990-01-01'
           WHERE
12
                    AND d.dept_name = 'Finance'
13
                    AND e.gender = 'M'
14
15
                    AND e.emp_no = de.emp_no
                    AND d.dept_no = de.dept_no
16
17
            );
```

181 12:59:35 CREATE VIEW info14 AS (SELECT e.emp_no, birt... 0 row(s) affected

0.031 sec





二、思考题

(PPT 中的思考题)

1.

Dept no 重复:报错主键重复

197 13:07:18 INSERT INTO employee departments (dept_no, dept_name) VALUES(d180, computer)
 198 13:07:19 INSERT INTO employee departments (dept_no, dept_name) VALUES(d180, computer)

rowip) affected nor Code: 1057 Dimbrate antivi H180 for less Vancatoparts PRIMAR' 031 sec

Dept name 重复:报错该列重复

199 13:08:45 INSERT INTO employee departments(dept_no, dept_name) VALUES(d110', 'computer')

iror Code: 1062. Duplicate entry 'computer' for key 'departments.dept_name'

0.015 sec

满足条件:

该数据中的 emp_no 能在 employees 表中找到元组 dept_no 能在 departments 中找到对应元组 表中不存在 emp_no 和 dept_no 都与新增数据相同的元组 新增数据各项都不为空

机制:

外键 foreign key, dept_emp 中的 emp_no, dept_no 分别为 employees 和 departments 的外键,则 dept_emp 中的外键必定在对 应表中存在,且为主键。

2.

分析:

从 query stats来看,第一种进行的时间消耗较长,第二种较少。从 execution plan来看,第一种 tmp table 的行数为 2990,第二种的行数为 930,比第一种大大的减少。

第二种查询把工资判断作为无关子查询,所以只用执行一次,而第 一种每一行都要执行一次工资判断。

第一种:

Timing (as measured at client side):

Execution time: 0:00:0.00000000

Timing (as measured by the server):

Execution time: 0:00:0.00298490
Table lock wait time: 0:00:0.00009800

Errors:

Had Errors: NO Warnings: 0

Rows Processed:

Rows affected: 0 Rows sent to client: 62 Rows examined: 9708

Temporary Tables:

Temporary disk tables created: 0 Temporary tables created: 1

Joins per Type:

Full table scans (Select_scan): 1
Joins using table scans (Select_full_join): 0
Joins using range search (Select_full_range_jo
Joins with range checks (Select_range_check):
Joins using range (Select_range): 0

Sorting:

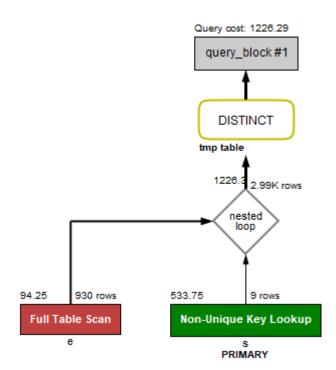
Sorted rows (Sort_rows): 0 Sort merge passes (Sort_merge_passes): 0 Sorts with ranges (Sort_range): 0 Sorts with table scans (Sort_scan): 0

Index Usage:

No Index used

Other Info:

Event Id: 667 Thread Id: 50



第二种:

Timing (as measured at client side):

Execution time: 0:00:0.00000000

Timing (as measured by the server):

Execution time: 0:00:0.00339520 Table lock wait time: 0:00:0.00010800

Frrors:

Had Errors: NO Warnings: 0

Rows Processed:

Rows affected: 0 Rows sent to dient: 62 Rows examined: 9708

Temporary Tables:

Temporary disk tables created: 0 Temporary tables created: 1

Joins per Type:

Full table scans (Select_scan): 1
Joins using table scans (Select_full_join): 0
Joins using range search (Select_full_range_joi
Joins with range checks (Select_range_check):
Joins using range (Select_range): 0

Sorting:

Sorted rows (Sort_rows): 0
Sort merge passes (Sort_merge_passes): 0
Sorts with ranges (Sort_range): 0
Sorts with table scans (Sort_scan): 0

Index Usage:

No Index used

Other Info:

Event Id: 676 Thread Id: 50

