



中国科学技术大学  
University of Science and Technology of China

# Lab 1

## SQL 练习

姓名: 高茂航

学号: PB22061161

日期: 2024.4.20

# Lab 1

## 1 数据库安装配置结果

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

## 2 任务一

根据所给 Student.csv、Teacher.csv、Course.csv、Score.csv 表中的数据信息,在数据库中创建对应的关系表并将数据录入到数据库中。

```
1 create schema s_t_c_s;
2 create table student(
3     SNO char(11) primary key,
4     NAME varchar(4),
5     GENDER varchar(6),
6     BIRTHDAY datetime,
7     DEPART int
8 );
9
10 insert into student (SNO, NAME, GENDER, BIRTHDAY, DEPART)
11 values
12 ('PB210000001', 'YH', 'male', '2002-03-29 00:00:00', 229),
13 ('PB210000002', 'ZY', 'male', '2001-09-12 00:00:00', 11),
14 ('PB210000003', 'FWJ', 'male', '2001-04-29 00:00:00', 12),
15 ('PB210000004', 'JTY', 'male', '2002-03-15 00:00:00', 11),
16 ('PB210000005', 'YY', 'female', '2002-08-12 00:00:00', 12),
17 ('PB210000006', 'HCC', 'male', '2002-06-25 00:00:00', 229),
18 ('PB210000007', 'RZJ', 'male', '2002-06-14 00:00:00', 11),
19 ('PB210000008', 'WCS', 'male', '2002-08-23 00:00:00', 13),
20 ('PB210000009', 'ZMS', 'female', '2002-06-23 00:00:00', 12),
21 ('PB210000010', 'WD', 'male', '2003-02-24 00:00:00', 13),
22 ('PB210000011', 'BL', 'female', '2002-05-08 00:00:00', 14),
23 ('PB210000012', 'ADN', 'male', '2004-06-26 00:00:00', 10),
24 ('PB210000013', 'HD', 'male', '2003-11-17 00:00:00', 14),
25 ('PB210000014', 'GNJ', 'male', '2001-01-28 00:00:00', 11),
26 ('PB210000015', 'XB', 'female', '2002-10-09 00:00:00', 12),
27 ('PB210000016', 'LC', 'female', '2003-11-30 00:00:00', 11),
28 ('PB210000017', 'TX', 'male', '2002-05-16 00:00:00', 12),
29 ('PB210000018', 'MY', 'male', '2003-12-02 00:00:00', 14),
30 ('PB210000019', 'MT', 'female', '2002-02-13 00:00:00', 10),
31 ('PB210000020', 'XY', 'female', '2001-02-14 00:00:00', 229),
32 ('PB210000021', 'LYH', 'male', '2002-09-30 00:00:00', 229),
33 ('PB210000022', 'MSW', 'male', '2003-06-17 00:00:00', 11),
34 ('PB210000023', 'HXY', 'male', '2003-02-18 00:00:00', 12),
35 ('PB210000024', 'YHS', 'female', '2003-04-01 00:00:00', 229),
36 ('PB210000025', 'YWB', 'male', '2003-08-12 00:00:00', 229);
37
38 create table teacher(
39     TNO char(7) primary key,
40     NAME varchar(4),
41     GENDER varchar(6),
42     BIRTHDAY datetime,
```

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```
43     POSITION varchar(30),
44     DEPART int
45 );
46
47 insert into teacher (TNO, NAME, GENDER, BIRTHDAY, POSITION, DEPART)
48 values
49 ('TA90021', 'HMZ', 'male', '1994/12/23 00:00:00', 'Instructor', 11),
50 ('TA90022', 'HB', 'female', '1978/4/9 00:00:00', 'Associate Professor', 10),
51 ('TA90023', 'ZDH', 'male', '1986/11/17 00:00:00', 'Instructor', 229),
52 ('TA90024', 'HS', 'male', '1977/4/10 00:00:00', 'Associate Professor', 6),
53 ('TA90025', 'HTZ', 'female', '1969/7/28 00:00:00', 'Professor', 11),
54 ('TA90026', 'TJY', 'male', '1973/10/3 00:00:00', 'Associate Professor', 12),
55 ('TA90027', 'XR', 'male', '1970/5/16 00:00:00', 'Associate Professor', 11),
56 ('TA90028', 'ZXY', 'male', '1986/7/16 00:00:00', 'Instructor', 229),
57 ('TA90029', 'ZR', 'male', '1975/9/24 00:00:00', 'Associate Professor', 11),
58 ('TA90030', 'SY', 'male', '1972/11/6 00:00:00', 'Professor', 229),
59 ('TA90031', 'LQA', 'female', '1986/11/17 00:00:00', 'Associate Professor', 10),
60 ('TA90032', 'GHJ', 'male', '1976/10/1 00:00:00', 'Associate Professor', 18);
61
62 create table course(
63     CNO char(8) primary key,
64     NAME varchar(50),
65     TYPE int,
66     TNO char(7),
67     foreign key(TNO) references teacher(TNO)
68 );
69
70 insert into course (CNO, NAME, TYPE, TNO)
71 values
72 ('20230400', 'Linear_Algebra', '1', 'TA90022'),
73 ('20230402', 'DB_Design', '1', 'TA90021'),
74 ('20230404', 'Machine_Learning', '1', 'TA90023'),
75 ('20230406', 'Operating_System', '1', 'TA90025'),
76 ('20230408', 'Natural_Language_Processing', '0', 'TA90027'),
77 ('20230410', 'Artificial_Intelligence', '1', 'TA90025'),
78 ('20230412', 'Data_Mining', '1', 'TA90025'),
79 ('20230414', 'Signal_Control', '1', 'TA90024'),
80 ('20230416', 'Computer_Network', '1', 'TA90029'),
81 ('20230418', 'Pattern_Recognition', '1', 'TA90023'),
82 ('20230420', 'Deep_Learning', '0', 'TA90030');
83
84 create table score (
85     SNO char(11),
86     CNO char(8),
87     DEGREE int,
88     primary key (SNO, CNO),
89     foreign key (SNO) references student(SNO),
90     foreign key (CNO) references course(CNO)
91 );
92
93
94 insert into score (SNO, CNO, DEGREE)
95 values
96 ('PB210000001', '20230402', 89),
97 ('PB210000002', '20230402', 94),
98 ('PB210000003', '20230402', 90),
99 ('PB210000004', '20230402', 95),
100 ('PB210000005', '20230402', 93),
101 ('PB210000006', '20230402', 75),
```

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```
102 ('PB210000007', '20230402', 78),
103 ('PB210000008', '20230402', 81),
104 ('PB210000001', '20230404', 73),
105 ('PB210000002', '20230404', 82),
106 ('PB210000003', '20230404', 92),
107 ('PB210000004', '20230404', 68),
108 ('PB210000005', '20230404', 72),
109 ('PB210000006', '20230404', 93),
110 ('PB210000007', '20230400', 77),
111 ('PB210000008', '20230400', 92),
112 ('PB210000009', '20230400', 82),
113 ('PB210000010', '20230400', 91),
114 ('PB210000008', '20230418', 69),
115 ('PB210000001', '20230418', 92),
116 ('PB210000002', '20230418', 95),
117 ('PB210000003', '20230418', 82),
118 ('PB210000010', '20230406', 83),
119 ('PB210000011', '20230406', 84),
120 ('PB210000012', '20230406', 78),
121 ('PB210000013', '20230406', 89),
122 ('PB210000017', '20230408', 81),
123 ('PB210000015', '20230408', 74),
124 ('PB210000018', '20230408', 95),
125 ('PB210000019', '20230408', 91),
126 ('PB210000020', '20230408', 89),
127 ('PB210000014', '20230410', 82),
128 ('PB210000016', '20230410', 72),
129 ('PB210000011', '20230410', 75),
130 ('PB210000018', '20230412', 85),
131 ('PB210000020', '20230412', 83),
132 ('PB210000008', '20230412', 77),
133 ('PB210000005', '20230412', 74),
134 ('PB210000015', '20230412', 98),
135 ('PB210000001', '20230412', 80),
136 ('PB210000019', '20230412', 81),
137 ('PB210000019', '20230416', 75),
138 ('PB210000020', '20230416', 89),
139 ('PB210000001', '20230416', 49),
140 ('PB210000002', '20230416', 87),
141 ('PB210000003', '20230416', 97),
142 ('PB210000004', '20230416', 86),
143 ('PB210000005', '20230416', 89),
144 ('PB210000006', '20230418', 90),
145 ('PB210000020', '20230418', 85),
146 ('PB210000021', '20230418', 83),
147 ('PB210000001', '20230420', 95),
148 ('PB210000006', '20230420', 89),
149 ('PB210000020', '20230420', 85),
150 ('PB210000021', '20230420', 83),
151 ('PB210000024', '20230420', 80),
152 ('PB210000025', '20230420', 87);
153
154 select * from student;
155 select * from teacher;
156 select * from course;
157 select * from score;
158
```

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SNO	NAME	GENDER	BIRTHDAY	DEPART
PB210000001	YH	male	2002-03-29 00:00:00	229
PB210000002	ZY	male	2001-09-12 00:00:00	11
PB210000003	FWJ	male	2001-04-29 00:00:00	12
PB210000004	JTY	male	2002-03-15 00:00:00	11
PB210000005	YY	female	2002-08-12 00:00:00	12
PB210000006	HCC	male	2002-06-25 00:00:00	229
PB210000007	RZJ	male	2002-06-14 00:00:00	11
PB210000008	WCS	male	2002-08-23 00:00:00	13
PB210000009	ZMS	female	2002-06-23 00:00:00	12
PB210000010	WD	male	2003-02-24 00:00:00	13
PB210000011	BL	female	2002-05-08 00:00:00	14
PB210000012	ADN	male	2004-06-26 00:00:00	10
PB210000013	HD	male	2003-11-17 00:00:00	14
PB210000014	GNJ	male	2001-01-28 00:00:00	11
PB210000015	XB	female	2002-10-09 00:00:00	12
PB210000016	LC	female	2003-11-30 00:00:00	11
PB210000017	TX	male	2002-05-16 00:00:00	12
PB210000018	MY	male	2003-12-02 00:00:00	14
PB210000019	MT	female	2002-02-13 00:00:00	10
PB210000020	XY	female	2001-02-14 00:00:00	229
PB210000021	LYH	male	2002-09-30 00:00:00	229
PB210000022	MSW	male	2003-06-17 00:00:00	11
PB210000023	HXY	male	2003-02-18 00:00:00	12
PB210000024	YHS	female	2003-04-01 00:00:00	229
PB210000025	YWB	male	2003-08-12 00:00:00	229

TNO	NAME	GENDER	BIRTHDAY	POSITION	DEPART
TA90021	HMZ	male	1994-12-23 00:00:00	Instructor	11
TA90022	HB	female	1978-04-09 00:00:00	Associate Professor	10
TA90023	ZDH	male	1986-11-17 00:00:00	Instructor	229
TA90024	HS	male	1977-04-10 00:00:00	Associate Professor	6
TA90025	HTZ	female	1969-07-28 00:00:00	Professor	11
TA90026	TJY	male	1973-10-03 00:00:00	Associate Professor	12
TA90027	XR	male	1970-05-16 00:00:00	Associate Professor	11
TA90028	ZXY	male	1986-07-16 00:00:00	Instructor	229
TA90029	ZR	male	1975-09-24 00:00:00	Associate Professor	11
TA90030	SY	male	1972-11-06 00:00:00	Professor	229
TA90031	LQA	female	1986-11-17 00:00:00	Associate Professor	10
TA90032	GHJ	male	1976-10-01 00:00:00	Associate Professor	18

CNO	NAME	TYPE	TNO
20230400	Linear_Algebra	1	TA90022
20230402	DB_Design	1	TA90021
20230404	Machine_Learning	1	TA90023
20230406	Operating_System	1	TA90025
20230408	Natural_Language_Processing	0	TA90027
20230410	Artificial_Intelligence	1	TA90025
20230412	Data_Mining	1	TA90025
20230414	Signal_Control	1	TA90024
20230416	Computer_Network	1	TA90029
20230418	Pattern_Recognition	1	TA90023
20230420	Deep_Learning	0	TA90030

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SNO	CNO	DEGREE
PB210000001	20230402	89
PB210000001	20230404	73
PB210000001	20230412	80
PB210000001	20230416	49
PB210000001	20230418	92
PB210000001	20230420	95
PB210000002	20230402	94
PB210000002	20230404	82
PB210000002	20230416	87
PB210000002	20230418	95
PB210000003	20230402	90
PB210000003	20230404	92
PB210000003	20230416	97
PB210000003	20230418	82
PB210000004	20230402	95
PB210000004	20230404	68
PB210000004	20230416	86
PB210000005	20230402	93
PB210000005	20230404	72
PB210000005	20230412	74
PB210000005	20230416	89
PB210000006	20230402	75
PB210000006	20230404	93
PB210000006	20230418	90
PB210000006	20230420	89
PB210000007	20230400	77
PB210000007	20230402	78
PB210000008	20230400	92
PB210000008	20230402	81
PB210000008	20230412	77
PB210000008	20230418	69

PB210000009	20230400	82
PB210000010	20230400	91
PB210000010	20230406	83
PB210000011	20230406	84
PB210000011	20230410	75
PB210000012	20230406	78
PB210000013	20230406	89
PB210000014	20230410	82
PB210000015	20230408	74
PB210000015	20230412	98
PB210000016	20230410	72
PB210000017	20230408	81
PB210000018	20230408	95
PB210000018	20230412	85
PB210000019	20230408	91
PB210000019	20230412	81
PB210000019	20230416	75
PB210000020	20230408	89
PB210000020	20230412	83
PB210000020	20230416	89
PB210000020	20230418	85
PB210000020	20230420	85
PB210000021	20230418	83
PB210000021	20230420	83
PB210000024	20230420	80
PB210000025	20230420	87

# Lab 1

## 3 任务二:实现以下各题功能的 SQL 语句

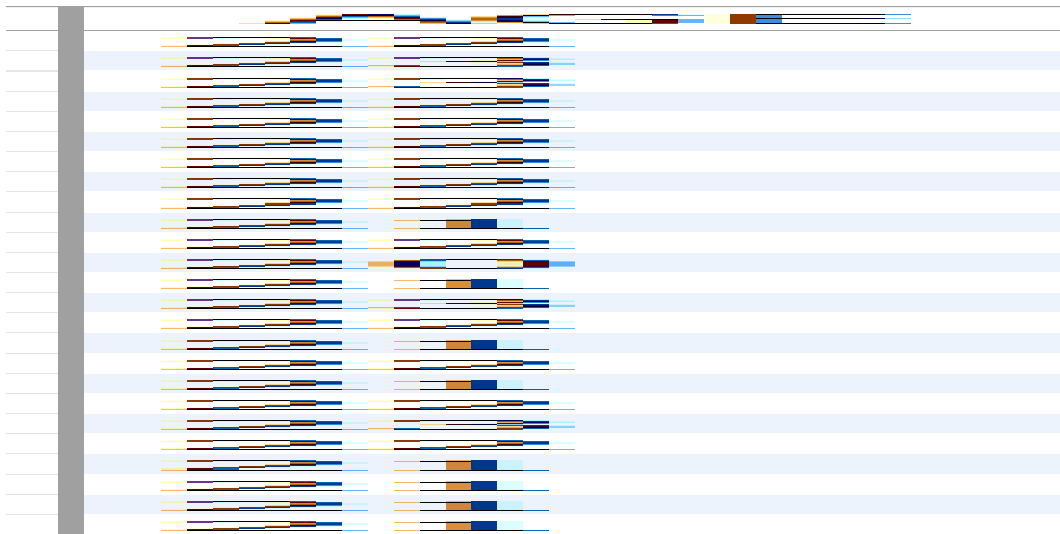
### 3.1 修改基本表

#### 3.1.1 在学生表 student 中增加一个新的属性列 AGE(年龄),类型为 int

```
1 alter table student add AGE int;
```

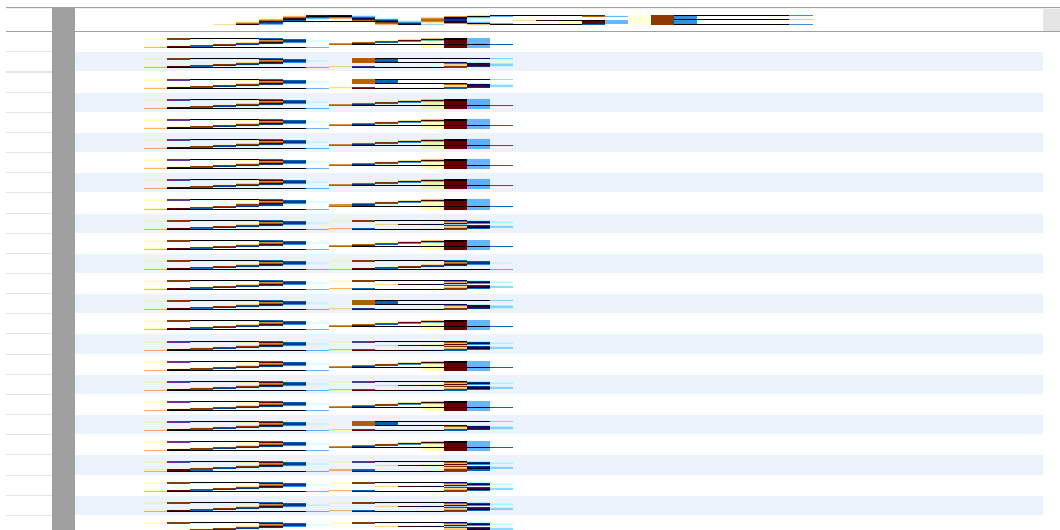
#### 3.1.2 计算每个学生的年龄 (AGE)

```
1 set sql_safe_updates = 0;  
2 update student set AGE = YEAR(CURDATE()) - YEAR(BIRTHDAY);  
3 select AGE from student;
```



#### 3.1.3 为每个学生的年龄加 2,将 AGE 的数据类型由 int 改为 char

```
1 update student set AGE = AGE + 2;  
2 select AGE from student;  
3  
4 alter table student modify column AGE CHAR(2);
```



# Lab 1

Column	Type	Default Value	Nullable	Character ...	Collation	Privileges	Extra	Comments
BIRTHDAY	datetime		YES	utf8mb4	utf8mb4_0900_...	select,insert,update,references		

## 3.1.4 删除属性列 AGE

```
1 alter table student drop column AGE;
2 select * from student;
```

Column	Type	Default Value	Nullable	Character ...	Collation	Privileges	Extra	Comments
BIRTHDAY	datetime		YES			select,insert,update,references		
DEPART	int		YES			select,insert,update,references		
GENDER	varchar(6)		YES	utf8mb4	utf8mb4_0900_...	select,insert,update,references		
NAME	varchar(4)		YES	utf8mb4	utf8mb4_0900_...	select,insert,update,references		
SNO	char(11)		NO	utf8mb4	utf8mb4_0900_...	select,insert,update,references		

## 3.1.5 创建一个教师课程数量表:teacher\_course(TNO,NUM\_COURSE),两个属性分别表示授课教师工号,课程数量,其中 TNO 是主键

1



## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.1.6 用一条语句,结合表 `course` 记录,为表 `teacher` 中所有教师,在表 `teacher__course` 添加对应记录(若表 `course` 中未出现的教师,则课程数量记为 `NULL`)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.1.7 删除表 `teacher__course` 中含有 `NULL` 的记录

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.1.8 删除表 teacher\_\_course

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.1.9 在学生表 student 、成绩表 score 中分别插入一些数据

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.1.10 在 score 表中删除你所选的课程中成绩最低的一门课程的记录（可能会用到子查询）

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.2 索引

3.2.1 用 create 语句在 course 表的名称 NAME 上建立普通索引 NAME\_INDEX

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.2.2 用 create 语句在 teacher 表的工号 TNO 上建立唯一索引 TNO\_INDEX

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.2.3 用 create 语句在 score 表上的学号 SNO 、成绩 DEGREE 上建立复合索引 RECORD\_INDEX,要求学号为降序,学号相同时成绩为升序

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.2.4 用一条语句查询表 `score` 的索引

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.2.5 删除 `teacher` 表字段 `TNO` 上的索引 `TNO_INDEX`

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3 查询

#### 3.3.1 查询和你属于同一个系的学生学号和姓名 (包括你本人)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

#### 3.3.2 查询和你属于同一个系的学生学号和姓名 (不包括你本人)

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.3 查询和你的某个好友属于同一个系的学生学号和姓名(9 题插入的某个好友)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.4 查询和你的两个好友都不在一个系的学生学号和姓名(9 题插入的两个好友)

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.5 查询教过你的所有老师的工号和姓名

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.6 查询 11 系和 229 系教师的总人数

1



## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.7 查询你的系中年龄(即当前年份减去出生年份)最大的学生的学号、姓名和年龄

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.8 查询你的系中年龄(即当前年份减去出生年份)最小的学生的学号、姓名和年龄

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

**3.3.9** 查询选修 DB\_Design 课程且成绩在 75 分以下(不包括 75)的学生的学号、姓名和分数

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

**3.3.10** 查询选修过“ZDH”老师课程的学生学号和姓名(去掉重复行)

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.11 查询选过某课程的学生学号和分数,并按分数降序展示

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.3.12 查询每门课的平均成绩,其中每行包含课程号、课程名和平均成绩(包括平均成绩为 NULL,即该课没有成绩)

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.3.13 查询每门必修课的平均成绩,其中每行包含课程号、课程名和平均成绩(包括平均成绩为 NULL,即该课没有成绩)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.3.14 查询至少选修了 ZDH 老师(TNO="TA90023")开设的所有课程的学生学号

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.3.15 查询每门课程的最高分和最低分,并计算其分数差。其中每行包含课程号、课程名和最高分、最低分和分数差(课程无成绩的不用包括)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.3.16 查询存在考试成绩低于 75 分的学生学号,以及低于 75 分的课程数量

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.17 查询所教过的课程中有学生考试成绩低于 75 分的教师的工号和姓名（去掉重复行）

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.18 查询选修少于 2 门课程的学生的学号、姓名

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.19 查询至少选修了 YH 同学 (SNO="PB210000001") 所选全部课程的学生学号

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.20 查询 Course 表中各个课程名称与相应的平均成绩 (没有选课的学生平均成绩为 NULL)

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.21 查询每个系的学生人数和每个系的平均分, 其中每行包含系号、系的人数和平均成绩

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.3.22 查询所有未选修 DB\_Design 课程或者 Data\_Mining 课程的学生姓名 (去掉重复行)

1



## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

**3.3.23** 查询各个课程的课程名及选该课的学生的最小年龄、最大年龄和平均年龄。(包括没有人选的课)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

**3.3.24** 查询选修了课程名中包含“Computer”课程的学生的学号和姓名

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.3.25 设课程平均成绩为  $x$ , 查询各个课程成绩处于  $[x-12, x+12]$  区间的同学的成绩表, 即包含 SNO、CNO、DEGREE

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.4 视图

- 3.4.1 建立 229 系的学生视图(db\_22\_student), 属性与 student 表一样, 并要求对该视图进行修改和插入操作时仍需保证该视图只有 229 系的学生

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.4.2 将 229 系学生视图(db\_229\_student)中学号为“PB210000020”的学生姓名改为你的姓名(英文首字母)

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.4.3 在 229 系学生视图(db\_229\_student)中找出年龄小于 22 岁的学生,包含 SNO、NAME

1

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.4.4 向 student 表中插入一名“学号 SA210110021, 姓名 QXY, 性别女, 生日 2007/7/27, 229 系”的学生。然后查询视图 db\_229\_student 的所有学生, 验证其是否更新

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.4.5 向视图 db\_229\_student 中插入一名“学号 SA210110023, 姓名 DPC, 性别男, 生日 1997/4/27, 11 系”的学生, 观察到了什么现象?

1

## Lab 1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.4.6 删除视图 db\_229\_student

```
1 drop view db_229_student;
```

## 3.5 触发器

3.5.1 创建关系表:teacher\_salary(TNO, SAL), 其中 TNO 是教师工号(主键), SAL 是教师工资(类型 float)

```
1
```

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

3.5.2 定义一个 BEFORE 行级触发器,为关系表 teacher\_salary 定义完整性规则:“表中出现的工号必须也出现在 teacher 表中,否则报错”。

```
1
```

## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.5.3 定义一个 BEFORE 行级触发器,为关系表 `teacher_salary` 定义完整性规则:“Instructor/Associate Professor/Professor 的工资不能低于 4000/7000/10000,且不能高于 7000/10000/13000,如果低于,则改为 4000/7000/10000”,如果高于,则改为 7000/10000/13000

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

- 3.5.4 删除刚刚创建的所有触发器

1

# Lab 1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

## 3.6 空值

3.6.1 将 score 表中的 Data\_Mining 课程成绩设为空值,然后在 score 表查询学生学号和分数,并按分数升序展示。观察 NULL 在 MySQL 中的大小是怎样的

1

SNO	DEGREE
PB22061161	NULL
PB210000001	NULL
PB210000020	NULL
PB210000018	NULL
PB210000005	NULL
PB210000019	NULL
PB210000008	NULL
PB210000015	NULL
PB210000001	49
PB210000004	68
PB210000008	69
PB210000005	72
PB210000016	72
PB210000001	73
PB210000015	74
PB210000011	75
PB210000006	75
PB210000019	75
PB210000007	77
PB210000012	78
PB210000007	78
PB210000024	80
PB210000008	81
PB210000017	81
PB210000009	82
PB210000003	82
PB210000002	82
PB210000014	82
PB210000021	83
PB210000021	83

# Lab 1

---

PB210000010	83
PB210000011	84
PB210000020	85
PB210000020	85
PB210000004	86
PB210000025	87
PB210000002	87
PB210000005	89
PB210000020	89
PB210000020	89
PB210000006	89
PB210000013	89
PB210000001	89
PB210000006	90
PB210000003	90
PB210000019	91
PB210000010	91
PB210000008	92
PB210000003	92
PB210000001	92
PB210000006	93
PB210000005	93
PB210000002	94
PB210000004	95
PB210000018	95
PB210000002	95
PB210000001	95
PB210000003	97
PB22061161	97

## 3.7 开放题

### 3.7.1

1

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32>net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

### 3.7.2

1



## Lab 1

---

```
C:\Windows\system32>mysqld install
The service already exists!
The current server installed: D:\mysql-8.0.36-winx64\bin\mysqld MySQL

C:\Windows\system32> net start mysql
The requested service has already been started.

More help is available by typing NET HELPMSG 2182.
```

## 4 Conclusion