

## Lab-3(Database Management System)

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- Screenshots of the result:

### Tables:

The screenshot displays a database management system interface. The top section contains a SQL editor with the following queries:

```
1 • CREATE DATABASE lab3_queries;
2 • USE lab3_queries;
3 • CREATE TABLE students (
4     student_id INT PRIMARY KEY,
5     first_name VARCHAR(100),
6     last_name VARCHAR(100),
7     email VARCHAR(100) UNIQUE,
8     birth_date DATE
9 );
10
11 • CREATE TABLE courses (
12     course_id INT PRIMARY KEY,
```

Below the editor, the 'Result Grid' tab is active, showing a list of tables: 'Tables\_in\_lab3\_queries', 'courses', 'enrollments', 'professors', and 'students'. The 'enrollments' table is selected.

The 'Output' section shows the results of the queries:

#	Time	Action	Message
9	18:05:05	INSERT INTO enrollments (enrollment_id, student_id, course_id) VALUES (1, 101, 111), ...	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0
10	18:05:13	SHOW TABLES	4 row(s) returned

78 (4, 104, 114),  
 79 (5, 105, 115),  
 80 (6, 106, 116),  
 81 (7, 107, 117),  
 82 (8, 108, 118),  
 83 (9, 109, 119),  
 84 (10, 110, 120);  
 85 • SHOW TABLES;  
 86 • DESCRIBE students;  
 87 • SELECT \* FROM students;  
 88 • SELECT \* FROM courses;  
 89 • SELECT \* FROM professors;

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

Field	Type	Null	Key	Default	Extra
student_id	int	NO	PRI	NULL	
first_name	varchar(100)	YES		NULL	
last_name	varchar(100)	YES		NULL	
email	varchar(100)	YES	UNI	NULL	
birth_date	date	YES		NULL	

Result 2 x | Read Only

Output

Action Output

#	Time	Action	Message
1	18:12:12	DESCRIBE students	5 row(s) returned

## • STUDENT TABLE:

85 • SHOW TABLES;  
 86 • DESCRIBE students;  
 87 • SELECT \* FROM students;  
 88 • SELECT \* FROM courses;  
 89 • SELECT \* FROM professors;

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

student_id	first_name	last_name	email	birth_date
101	Li	Wei	liwei@gmail.com	2000-04-10
102	Wang	Fang	wangfang@gmail.com	1999-08-23
103	Chen	Li	chenli@gmail.com	2001-11-02
104	Chuan	Yao	chuanyao@gmail.com	2000-06-15
105	Fei	Jia	feijia@gmail.com	2001-02-25
106	Tang	Lizhen	tanglizhen@gmail.com	2002-11-05
107	Qing	Ma	qingma@gmail.com	2001-03-26
108	Cheng	Yao	chengyao@gmail.com	2000-06-08
109	Debao	Li	debaoli@gmail.com	2001-02-27
110	Huang	Fang	huangfang@gmail.com	2002-11-10
*	NULL	NULL	NULL	NULL

students 4 x | Apply | Revert

Output

Action Output

#	Time	Action	Message
2	18:13:32	SELECT * FROM students LIMIT 0, 1000	10 row(s) returned
3	18:14:42	SELECT * FROM students LIMIT 0, 1000	10 row(s) returned

## • COURSES TABLE:

Limit to 1000 rows

```

85 • SHOW TABLES;
86 • DESCRIBE students;
87 • SELECT * FROM students;
88 • SELECT * FROM courses;
89 • SELECT * FROM professors;

```

Execute the statement under the keyboard cursor

course_id	course_name	credits
111	Database Management	3
112	Data Structures	4
113	Operating Systems	4
114	System Level Programming	3
115	Computer Networks	4
116	Artificial Intelligence	3
117	Computer Architecture	4
118	Image Processing	3
119	Object Oriented Programing	4
120	Web Mining	3
NULL	NULL	NULL

courses 5 x Apply Revert

Output

Action Output

#	Time	Action	Message
3	18:14:42	SELECT * FROM students LIMIT 0, 1000	10 row(s) returned
4	18:15:12	SELECT * FROM courses LIMIT 0, 1000	10 row(s) returned

## • PROFESSOR TABLE:

Limit to 1000 rows

```

87 • SELECT * FROM students;
88 • SELECT * FROM courses;
89 • SELECT * FROM professors;
90 • SELECT * FROM enrollments;
91

```

professor_id	first_name	last_name	email
1	Dr. Huang	Xiu	huangxiu@scu.edu.cn
2	Dr. Zhao	Jun	zhaojun@scu.edu.cn
3	Dr. Linda	Lee	lindalee@scu.edu.cn
4	Dr. Yuan	Xuedong	yuanxuedong@scu.edu.cn
5	Dr. Guo	Jixiang	guojixiang@scu.edu.cn
6	Dr. Shu	Li	shuli@scu.edu.cn
7	Dr. Hao	Yin	haoyin@scu.edu.cn
8	Dr. Zhang	Li	zhangli@scu.edu.cn
9	Dr. Hui	Fang	huifang@scu.edu.cn
10	Dr. Chen	Li	chenli@scu.edu.cn
NULL	NULL	NULL	NULL

professors 7 x Apply Revert

Output

Action Output

#	Time	Action	Message
6	18:16:52	INSERT INTO professors (professor_id, first_name, last_name, email) VALUES (1, 'Dr. Hu...	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0
7	18:17:03	SELECT * FROM professors LIMIT 0, 1000	10 row(s) returned

- **ENROLLMENT TABLE:**

Limit to 1000 rows

```

87 • SELECT * FROM students;
88 • SELECT * FROM courses;
89 • SELECT * FROM professors;
90 • SELECT * FROM enrollments;
91
92

```

Result Grid

enrollment_id	student_id	course_id	enrollment_date
1	101	111	2025-04-10 18:05:05
2	102	112	2025-04-10 18:05:05
3	103	113	2025-04-10 18:05:05
4	104	114	2025-04-10 18:05:05
5	105	115	2025-04-10 18:05:05
6	106	116	2025-04-10 18:05:05
7	107	117	2025-04-10 18:05:05
8	108	118	2025-04-10 18:05:05
9	109	119	2025-04-10 18:05:05
10	110	120	2025-04-10 18:05:05
NULL	NULL	NULL	NULL

enrollments 8 x

Output

Action Output

#	Time	Action	Message
7	18:17:03	SELECT * FROM professors LIMIT 0, 1000	10 row(s) returned
8	18:17:50	SELECT * FROM enrollments LIMIT 0, 1000	10 row(s) returned

- **Creating a VIEW with only basic student information:**

Limit to 1000 rows

```

92 -- Creating a VIEW with only basic student info and no email or birthdate
93 • CREATE VIEW student_basic_info AS
94   SELECT student_id, first_name, last_name
95   FROM students;
96 • SELECT * FROM student_basic_info;
97

```

Result Grid

student_id	first_name	last_name
101	Li	Wei
102	Wang	Fang
103	Chen	Li
104	Chuan	Yao
105	Fei	Jia
106	Tang	Lizhen
107	Qing	Ma
108	Cheng	Yao
109	Debao	Li
110	Huang	Fang

student\_basic\_info 5 x

Read Only

- Create and test a TRANSACTION:(Inserting a new student )

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

student_id	first_name	last_name	email	birth_date
101	Li	Wei	liwei@gmail.com	2000-04-10
102	Wang	Fang	wangfang@gmail.com	1999-08-23
103	Chen	Li	chenli@gmail.com	2001-11-02
104	Chuan	Yao	chuanyao@gmail.com	2000-06-15
105	Fei	Jia	fejia@gmail.com	2001-02-25
106	Tang	Lizhen	tanglizhen@gmail.com	2002-11-05
107	Qing	Ma	qingma@gmail.com	2001-03-26
108	Cheng	Yao	chengyao@gmail.com	2000-06-08
109	Debao	Li	debaoli@gmail.com	2001-02-27
110	Huang	Fang	huangfang@gmail.com	2002-11-10
201	Irish	Li	irishli@gmail.com	2002-01-01
*	NULL	NULL	NULL	NULL

students 9 x Apply Revert

Output

Action Output

#	Time	Action	Message
✓ 13	18:18:50	INSERT INTO students (student_id, first_name, last_name, email, birth_date) VALUES (201, ...	1 row(s) affected
✓ 14	18:19:26	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned

student_id	first_name	last_name	email	birth_date
201	Irish	Li	irishli@gmail.com	2002-01-01
*	NULL	NULL	NULL	NULL

students 9 x

Output

Action Output

#	Time	Action	Message
✓ 13	18:18:50	INSERT INTO students (student_id, first_name, last_name, email, birth_date) VALUES (201, ...	1 row(s) affected
✓ 14	18:19:26	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned

- Updating the last name of the newly added student:

Result Grid					
student_id	first_name	last_name	email	birth_date	
101	Li	Wei	liwei@gmail.com	2000-04-10	
102	Wang	Fang	wangfang@gmail.com	1999-08-23	
103	Chen	Li	chenli@gmail.com	2001-11-02	
104	Chuan	Yao	chuan Yao@gmail.com	2000-06-15	
105	Fei	Jia	feijia@gmail.com	2001-02-25	
106	Tang	Lizhen	tanglizhen@gmail.com	2002-11-05	
107	Qing	Ma	qingma@gmail.com	2001-03-26	
108	Cheng	Yao	chengyao@gmail.com	2000-06-08	
109	Debao	Li	debaoli@gmail.com	2001-02-27	
110	Huang	Fang	huangfang@gmail.com	2002-11-10	
201	Irish	Shi	irishli@gmail.com	2002-01-01	
NULL	NULL	NULL	NULL	NULL	

students 10					
#	Time	Action	Message		
15	18:20:28	UPDATE students SET last_name = 'Shi' WHERE student_id = 201	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0		
16	18:20:58	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned		

students 10					
#	Time	Action	Message		
15	18:20:28	UPDATE students SET last_name = 'Shi' WHERE student_id = 201	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0		
16	18:20:58	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned		

## ROLLBACK:

Result Grid					
student_id	first_name	last_name	email	birth_date	
201	Irish	Shi	irishli@gmail.com	2002-01-01	
NULL	NULL	NULL	NULL	NULL	

  

students 11					
#	Time	Action	Message		
16	18:20:58	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned		
17	18:22:06	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	1 row(s) returned		

SQL Editor interface showing a query execution window. The query executed is:

```
SELECT * FROM students WHERE student_id = 201;
```

The output shows the following results:

student_id	first_name	last_name	email	birth_date
201	Wang	Fang		

The output window also displays the following messages:

#	Time	Action	Message
18	18:22:46	ROLLBACK	0 row(s) affected
19	18:22:55	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	0 row(s) returned

- **A COMPLEX QUERY that uses: (JOIN between multiple tables A SUBQUERY A WHERE or HAVING condition)**

SQL Editor interface showing a complex query execution window. The query executed is:

```
JOIN enrollments e ON s.student_id = e.student_id
JOIN courses c ON e.course_id = c.course_id
WHERE c.credits > (
  SELECT AVG(credits) FROM courses
);
```

The output shows the following results:

first_name	last_name	course_name	credits
Wang	Fang	Data Structures	4
Chen	Li	Operating Systems	4
Fei	Jia	Computer Networks	4
Qing	Ma	Computer Architecture	4
Debao	Li	Object Oriented Programming	4

The output window also displays the following messages:

#	Time	Action	Message
19	18:22:55	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	0 row(s) returned
20	18:23:27	SELECT s.first_name, s.last_name, c.course_name, c.credits FROM students s JOIN enrollm...	5 row(s) returned

- **(Bonus — Optional) Creating a new ROLE or USER and GRANT specific privileges like SELECT on view or table.**

119

120 • `SELECT * FROM students WHERE student_id = 201;`

121

Automatic context help is disabled. Use the toolbar t

Context Help Snippets

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 4	18:15:12	SELECT * FROM courses LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 5	18:15:36	SELECT * FROM professors LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
✓ 6	18:16:52	INSERT INTO professors (professor_id, first_name, last_name, email) VALUES (1, 'Dr. Hu...	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.016 sec
✓ 7	18:17:03	SELECT * FROM professors LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 8	18:17:50	SELECT * FROM enrollments LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 9	18:18:28	CREATE VIEW student_basic_info AS SELECT student_id, first_name, last_name FROM st...	0 row(s) affected	0.016 sec
✓ 10	18:18:34	ALTER TABLE courses ADD CONSTRAINT chk_credits_positive CHECK (credits > 0)	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.062 sec
✓ 11	18:18:41	CREATE INDEX idx_students_lastname ON students(last_name)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.031 sec
✓ 12	18:18:45	START TRANSACTION	0 row(s) affected	0.000 sec
✓ 13	18:18:50	INSERT INTO students (student_id, first_name, last_name, email, birth_date) VALUES (201, ...	1 row(s) affected	0.015 sec
✓ 14	18:19:26	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned	0.000 sec / 0.000 sec
✓ 15	18:20:28	UPDATE students SET last_name = 'Shi' WHERE student_id = 201	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.000 sec
✓ 16	18:20:58	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned	0.000 sec / 0.000 sec
✓ 17	18:22:06	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
✓ 18	18:22:46	ROLLBACK	0 row(s) affected	0.000 sec
✓ 19	18:22:55	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
✓ 20	18:23:27	SELECT s.first_name, s.last_name, c.course_name, c.credits FROM students s JOIN enrollm...	5 row(s) returned	0.000 sec / 0.000 sec
✓ 21	18:24:05	CREATE ROLE viewer_role	0 row(s) affected	0.015 sec
✓ 22	18:24:11	GRANT SELECT ON student_basic_info TO viewer_role	0 row(s) affected	0.015 sec

SCHEMAS

Filter objects

- hw\_1
  - Tables
  - Views
  - Stored Procedures
  - Functions
- lab2\_queries
  - Tables
  - Views
  - Stored Procedures
  - Functions
- lab3\_queries
  - Tables
  - Views
  - Stored Procedures
  - Functions
- university\_db

Administration Schemas

Information

Schema: lab3\_queries

Object Info Session

Output

Action Output

#	Time	Action	Message	Duration / Fetch
✓ 1	18:12:12	DESCRIBE students	5 row(s) returned	0.000 sec / 0.000 sec
✓ 2	18:13:32	SELECT * FROM students LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 3	18:14:42	SELECT * FROM students LIMIT 0, 1000	10 row(s) returned	0.016 sec / 0.000 sec
✓ 4	18:15:12	SELECT * FROM courses LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 5	18:15:36	SELECT * FROM professors LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
✓ 6	18:16:52	INSERT INTO professors (professor_id, first_name, last_name, email) VALUES (1, 'Dr. Hua...	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.016 sec
✓ 7	18:17:03	SELECT * FROM professors LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 8	18:17:50	SELECT * FROM enrollments LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
✓ 9	18:18:28	CREATE VIEW student_basic_info AS SELECT student_id, first_name, last_name FROM stud...	0 row(s) affected	0.016 sec
✓ 10	18:18:34	ALTER TABLE courses ADD CONSTRAINT chk_credits_positive CHECK (credits > 0)	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.062 sec
✓ 11	18:18:41	CREATE INDEX idx_students_lastname ON students(last_name)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0	0.031 sec
✓ 12	18:18:45	START TRANSACTION	0 row(s) affected	0.000 sec
✓ 13	18:18:50	INSERT INTO students (student_id, first_name, last_name, email, birth_date) VALUES (201, 'tr...	1 row(s) affected	0.015 sec
✓ 14	18:19:26	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned	0.000 sec / 0.000 sec
✓ 15	18:20:28	UPDATE students SET last_name = 'Shi' WHERE student_id = 201	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.000 sec
✓ 16	18:20:58	SELECT * FROM students LIMIT 0, 1000	11 row(s) returned	0.000 sec / 0.000 sec
✓ 17	18:22:06	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
✓ 18	18:22:46	ROLLBACK	0 row(s) affected	0.000 sec
✓ 19	18:22:55	SELECT * FROM students WHERE student_id = 201 LIMIT 0, 1000	0 row(s) returned	0.000 sec / 0.000 sec
✓ 20	18:23:27	SELECT s.first_name, s.last_name, c.course_name, c.credits FROM students s JOIN enrollme...	5 row(s) returned	0.000 sec / 0.000 sec
✓ 21	18:24:05	CREATE ROLE viewer_role	0 row(s) affected	0.015 sec
✓ 22	18:24:11	GRANT SELECT ON student_basic_info TO viewer_role	0 row(s) affected	0.015 sec

137 • `CREATE ROLE viewer_role;`

138 • `GRANT SELECT ON student_basic_info TO viewer_role;`

139 • `SELECT user, host FROM mysql.user WHERE user = 'viewer_role';`

140

141

142

Result Grid

user	host
viewer_role	%

Filter Rows: Export: Wrap Cell Content: Result Grid