

DATABASE MANAGEMENT SYSTEM

MINI-PROJECT- REPORT

LANGUAGE LEARNING APP

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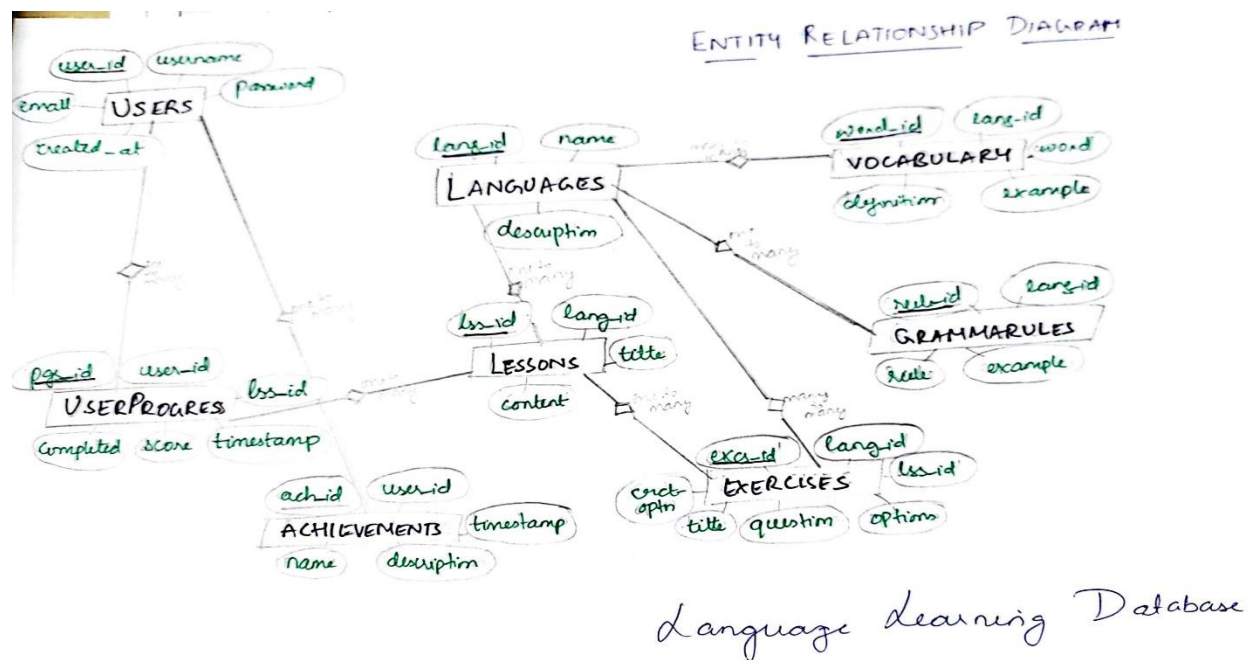
Sem&Sec: 5H

An Overview

This project has a simple language learning database created using MySQL that has entities like Languages, Lessons etc. The user is to login and learn the chosen language through exercises and vocabulary and their progress shall be recorded.

The backend is MySQL and Python Flask and the front end is React

ER Diagram



Relational Schema

USERS

<u>user-id</u>	username	password	email	created_at
----------------	----------	----------	-------	------------

LANGUAGES

<u>lang-id</u>	name	description
----------------	------	-------------

LESSONS

<u>les-id</u>	lang-id	title	content
---------------	---------	-------	---------

VOCABULARY

<u>word-id</u>	lang-id	word	definition	example
----------------	---------	------	------------	---------

EXERCISES

<u>exer-id</u>	lang-id	les-id	title	question	options	correct option
----------------	---------	--------	-------	----------	---------	----------------

GRAMMAR RULES

<u>rule-id</u>	lang-id	rule	example
----------------	---------	------	---------

USER PROGRESS

<u>prog-id</u>	user-id	les-id	completed	score	timestamp
----------------	---------	--------	-----------	-------	-----------

ACHIEVEMENTS

~~ach-id~~

<u>ach-id</u>	user-id	name	timestamp	description
---------------	---------	------	-----------	-------------

RELATIONAL SCHEMA

Language Learning Database.

Trigger-

```
mysql> delimiter //
mysql> create trigger log_userprogress_update
-> after update on UserProgress
-> for each row
-> begin
-> insert into UserProgress_log (user_id, action_type, timestamp)
-> values (new.user_id, 'update', now());
-> end;
-> //delimiter
Query OK, 0 rows affected (0.01 sec)
```

Nested query

```
mysql> select name, (
-> select count(*)
-> from Grammarrules
-> where Grammarrules.lang_id = Languages.lang_id
-> ) AS total_grammar_rules
-> from Languages;
```

name	total_grammar_rules
Hindi	1
Kannada	1
Marathi	1
Tamil	1
Telugu	1

5 rows in set (0.00 sec)

MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

Filter objects

- 394_fest_db
- 394_festdb_lab1
- art
- asmt
- company
- craft
- e_bike
- ecommerce
- fest_database
- langlearn
 - achievement
 - achievements
 - exercise
 - exercises
 - grammar_rule
 - grammarrules
 - language
 - languages

Administration Schemas

Information: Schema: langlearn

Query 1 SQL File 3

```
1 SELECT up.user_id, up.lss_id, up.completed, up.score, up.timestamp,
2 e.title AS exercise_title, e.question, e.options, e.crct_optn
3 FROM UserProgress up
4 LEFT JOIN Exercises e ON up.lss_id = e.lss_id;
```

Result Grid

	user_id	lss_id	completed	score	timestamp	exercise_title	question	options	
1	1	1	1	90	2023-02-01 09:45:00	Greetings exercise	What is the common greeting in Hindi?	a) ??????, b) ?? ???? ??, c) ???	1
2	1	1	1	80	2023-02-02 10:30:00	Greetings exercise	What is the common greeting in Hindi?	a) ??????, b) ?? ???? ??, c) ???	1
3	2	1	1	75	2023-02-05 11:35:00	Kannada Numbers	What is 10 in Kannada?	a) ??????, b) ?????, c) ?????	1
4	3	1	1	66	2023-02-08 09:40:00	Kannada Numbers	What is 10 in Kannada?	a) ??????, b) ?????, c) ?????	1
5	1	1	1	95	2023-02-15 08:15:00	Kannada Numbers	What is 10 in Kannada?	a) ??????, b) ?????, c) ?????	1

Result 5 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
1	13.26.08	SELECT title AS lesson_title, e.title AS exercise_title, e.question, e.options, e.crct_optn FROM...	5 row(s) returned	0.000 sec / 0.000 sec
2	13.27.26	SELECT up.user_id, up.lss_id, up.completed, up.score, up.timestamp, e.title AS exercise_title...	5 row(s) returned	0.000 sec / 0.000 sec

SQL Additions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

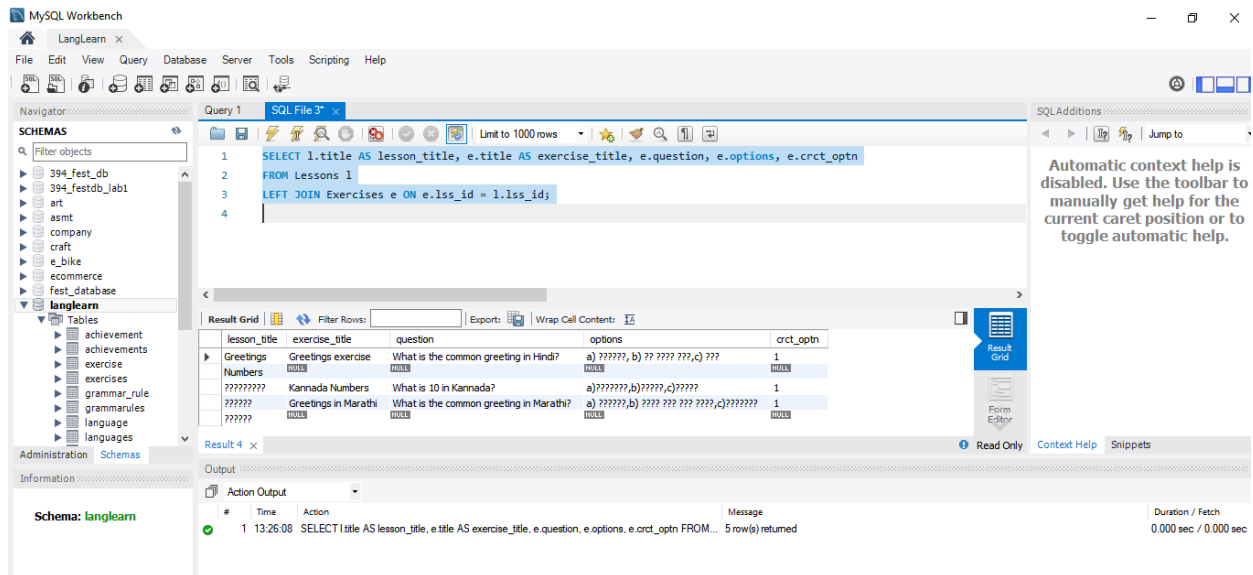
Join – left join

```
mysql> select up.user_id, up.lss_id, up.completed, up.score, up.timestamp,
-> e.title AS exercise_title, e.question, e.options, e.crct_optn
-> from UserProgress up
-> left join exercises e on up.lss_id = e.lss_id;

+-----+-----+-----+-----+-----+-----+-----+-----+
| user_id | lss_id | completed | score | timestamp          | exercise_title | question | options | crct_optn |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 1 | 1 | 90 | 2023-02-01 09:45:00 | Greetings exercise | What is the common greeting in Hindi? | a) ??????, b) ?? ????, c) ??? | 1 |
| 2 | 1 | 1 | 80 | 2023-02-02 10:30:00 | Greetings exercise | What is the common greeting in Hindi? | a) ??????, b) ?? ????, c) ??? | 1 |
| 3 | 2 | 1 | 75 | 2023-02-05 11:35:00 | NULL | NULL | NULL | NULL |
| 4 | 3 | 1 | 66 | 2023-02-08 09:40:00 | Kannada Numbers | What is 10 in Kannada? | a)???????,b)?????,c)????? | 1 |
| 5 | 3 | 1 | 95 | 2023-02-15 08:15:00 | Kannada Numbers | What is 10 in Kannada? | a)???????,b)?????,c)????? | 1 |
+-----+-----+-----+-----+-----+-----+-----+-----+

5 rows in set (0.00 sec)

mysql>
```



Aggregate query

```
mysql> select up.user_id, avg(up.score) as average_score, count(distinct a.ach_id) AS total_achievements
-> from UserProgress up
-> left join achievements a on up.user_id = a.user_id
-> group by up.user_id;

+-----+-----+-----+
| user_id | average_score | total_achievements |
+-----+-----+-----+
| 1 | 90.0000 | 1 |
| 2 | 80.0000 | 1 |
| 3 | 75.0000 | 0 |
| 4 | 66.0000 | 0 |
| 5 | 95.0000 | 1 |
+-----+-----+-----+

5 rows in set (0.00 sec)

mysql>
```

MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

Filter objects

394_fest_db
394_festdb_lab1
art
asmt
company
craft
e_bike
ecommerce
fest_database
langlearn

Tables

achievement
achievements
exercise
exercises
grammar_rule
grammarrules
language
languages

Administration Schemas

Schema: langlearn

Query 1 SQL File 3* SQL File 4* SQL File 5* x

Limit to 1000 rows

1 • SELECT
2 u.user_id,
3 u.username,
4 COUNT(up.lss_id) AS total_completed_lessons
5 FROM
6 users u
7 LEFT JOIN

Result Grid

user_id	username	total_completed_lessons
1	anya_varma	1
2	raji_patel	1
3	neha_sharma	1
4	arjun_mehra	1
5	priya_ramesh	1

Output

Action Output

#	Time	Action	Message	Duration / Fetch
1	13:45:53	SELECT u.user_id, u.username, COUNT(up.lss_id) AS total_completed_lessons FROM ...	5 row(s) returned	0.015 sec / 0.000 sec
2	13:46:04	SELECT u.user_id, u.username, COUNT(up.lss_id) AS total_completed_lessons FROM ...	5 row(s) returned	0.000 sec / 0.000 sec

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Select (Read operation)-

```
mysql> select * from Lessons;
```

lss_id	lang_id	title	content
1	1	Greetings	learn common greetings in Hindi
2	1	Numbers	learn numbers in Hindi
3	2	????????	learn numbers in Kannada
4	3	??????	greetings in Marathi
5	4	??????	learn numbers in Tamil

5 rows in set (0.00 sec)

```
mysql>
```

MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

Filter objects

394_fest_db
394_festdb_lab1
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languages

Administration Schemas

Schema: langlearn

Query 1 SQL File 3* SQL File 4* x

Limit to 1000 rows

1 • SELECT * FROM Lessons;
2

Result Grid

lss_id	lang_id	title	content
1	1	Greetings	learn common greetings in Hindi
2	1	Numbers	learn numbers in Hindi
3	2	????????	learn numbers in Kannada
4	3	??????	greetings in Marathi
5	4	??????	learn numbers in Tamil

Lessons 1 x

Output

Action Output

#	Time	Action	Message	Duration / Fetch
1	13:26:08	SELECT title AS lesson_title, e.title AS exercise_title, e.question, e.options, e.crct_optr FROM ...	5 row(s) returned	0.000 sec / 0.000 sec
2	13:27:26	SELECT up.user_id, up.lss_id, up.completed, up.score, up.timestamp, e.title AS exercise_title	5 row(s) returned	0.000 sec / 0.000 sec
3	13:28:28	SELECT * FROM Lessons LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

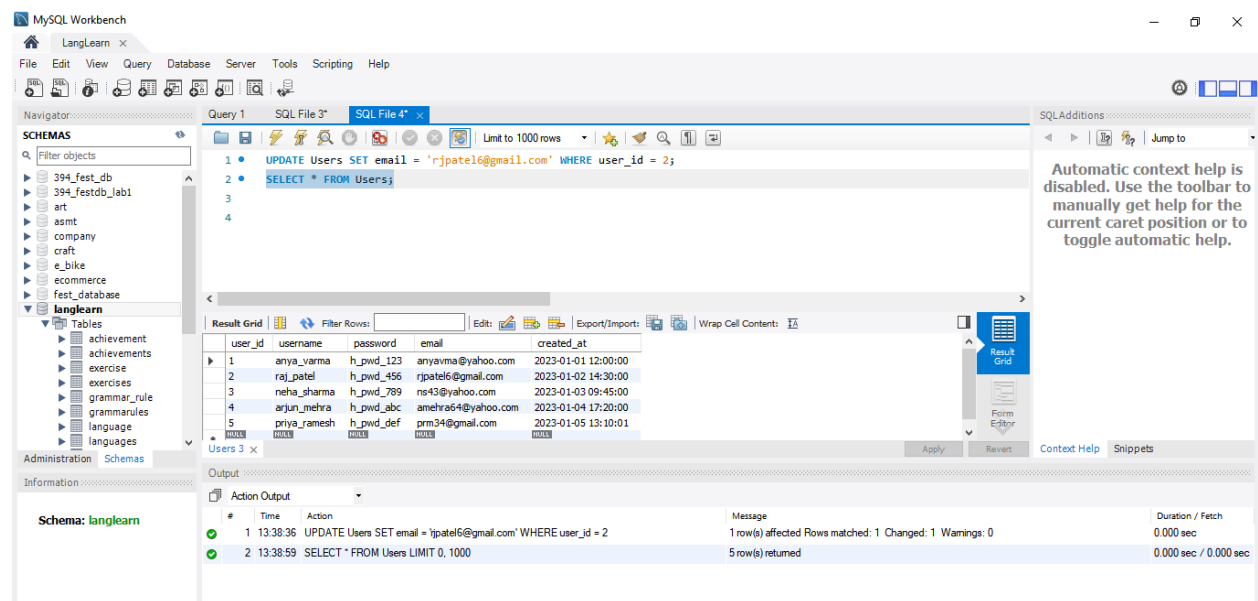
Update –

```
mysql> select * from Users;
+-----+-----+-----+-----+-----+
| user_id | username | password | email | created_at |
+-----+-----+-----+-----+-----+
| 1 | anya_varma | h_pwd_123 | anyavma@yahoo.com | 2023-01-01 12:00:00 |
| 2 | raj_patel | h_pwd_456 | rjpatel@gmail.com | 2023-01-02 14:30:00 |
| 3 | neha_sharma | h_pwd_789 | ns43@yahoo.com | 2023-01-03 09:45:00 |
| 4 | arjun_mehra | h_pwd_abc | amehra78@gmail.com | 2023-01-04 17:20:00 |
| 5 | priya_ramesh | h_pwd_def | prm34@gmail.com | 2023-01-05 13:10:01 |
+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> update Users set email = 'amehra64@yahoo.com' where user_id=4;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1 Changed: 1 Warnings: 0

mysql> select * from Users;
+-----+-----+-----+-----+-----+
| user_id | username | password | email | created_at |
+-----+-----+-----+-----+-----+
| 1 | anya_varma | h_pwd_123 | anyavma@yahoo.com | 2023-01-01 12:00:00 |
| 2 | raj_patel | h_pwd_456 | rjpatel@gmail.com | 2023-01-02 14:30:00 |
| 3 | neha_sharma | h_pwd_789 | ns43@yahoo.com | 2023-01-03 09:45:00 |
| 4 | arjun_mehra | h_pwd_abc | amehra64@yahoo.com | 2023-01-04 17:20:00 |
| 5 | priya_ramesh | h_pwd_def | prm34@gmail.com | 2023-01-05 13:10:01 |
+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql>
```



Delete query

```
mysql> select * from lessons;
+-----+-----+-----+-----+
| lss_id | lang_id | title           | content                                     |
+-----+-----+-----+-----+
| 1      | 1       | Greetings       | learn common greetings in Hindi           |
| 2      | 1       | Numbers         | learn numbers in Hindi                    |
| 3      | 2       | ??????????     | learn numbers in Kannada                  |
| 4      | 3       | ??????????     | greetings in Marathi                      |
| 5      | 4       | ??????????     | learn numbers in Tamil                    |
| 6      | 5       | ??????????     | learn numbers in Telgu                    |
+-----+-----+-----+-----+
6 rows in set (0.00 sec)

mysql> delete from Lessons
-> where lss_id=6;
Query OK, 1 row affected (0.01 sec)

mysql> select * from lessons;
+-----+-----+-----+-----+
| lss_id | lang_id | title           | content                                     |
+-----+-----+-----+-----+
| 1      | 1       | Greetings       | learn common greetings in Hindi           |
| 2      | 1       | Numbers         | learn numbers in Hindi                    |
| 3      | 2       | ??????????     | learn numbers in Kannada                  |
| 4      | 3       | ??????????     | greetings in Marathi                      |
| 5      | 4       | ??????????     | learn numbers in Tamil                    |
+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql>
```

MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

- 394_fest_db
- 394_festdb_lab1
- art
- asmt
- company
- craft
- e_bike
- ecommerce
- fest_database
- langlearn**
 - Tables
 - achievement
 - achievements
 - exercise
 - exercises
 - grammar_rule
 - grammarrules
 - language
 - languages

Administration Schemas

Information: Schema: langlearn

Query 1 SQL File 3* SQL File 4* x

Limit to 1000 rows

```
1 • DELETE FROM Lessons where lss_id=5;
2 • SELECT * FROM Lessons;
3
```

Result Grid

lss_id	lang_id	title	content
1	1	Greetings	learn common greetings in Hindi
2	1	Numbers	learn numbers in Hindi
3	2	?????????	learn numbers in Kannada
4	3	?????????	greetings in Marathi
•	•	•	•

Lessons 2 x

Apply Revert Context Help Snippets

Output

#	Time	Action	Message	Duration / Fetch
✓ 1	13:26:08	SELECT title AS lesson_title, e.title AS exercise_title, e.question, e.options, e.crtd_optn FROM ...	5 row(s) returned	0.000 sec / 0.000 sec
✓ 2	13:27:26	SELECT up.user_id, up.lss_id, up.completed, up.score, up.timestamp, e.title AS exercise_ti...	5 row(s) returned	0.000 sec / 0.000 sec
✓ 3	13:28:28	SELECT * FROM Lessons LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec
✓ 4	13:31:09	DELETE FROM Lessons where lss_id=5	1 row(s) affected	0.000 sec
✓ 5	13:31:31	SELECT * FROM Lessons LIMIT 0, 1000	4 row(s) returned	0.000 sec / 0.000 sec

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Privileges – Instructor and User


```
mysql> grant select,insert,update,delete on Lessons to Instructor;
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> show grants for Instructor;
```

```
-----+-----+
| Grants for Instructor@% |
+-----+-----+
| GRANT USAGE ON *.* TO `Instructor`@`%` |
| GRANT SELECT, INSERT, UPDATE, DELETE ON `languarn`.`lessons` TO `Instructor`@`%` |
+-----+-----+
2 rows in set (0.00 sec)
```

```
mysql>
```

```
mysql> grant select on Lessons to User;
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> grant select on Vocabulary to User;
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> grant select on UserProgress to User;
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> grant select on Achievements to User;
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> show grants for User;
```

```
-----+-----+
| Grants for User@% |
+-----+-----+
| GRANT USAGE ON *.* TO `User`@`%` |
| GRANT SELECT ON `languarn`.`achievements` TO `User`@`%` |
| GRANT SELECT ON `languarn`.`lessons` TO `User`@`%` |
| GRANT SELECT ON `languarn`.`userprogress` TO `User`@`%` |
| GRANT SELECT ON `languarn`.`vocabulary` TO `User`@`%` |
+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql>
```


MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

Filter objects

394_fest_db
394_festdb_lab1
art
asmt
company
craft
e_bike
ecommerce
fest_database
langlearn

Tables
achievement
achievements
exercise
exercises
grammar_rule
grammars
language
languages

Administration Schemas

Schema: langlearn

Query 1 SQL File 3*

Limit to 1000 rows

```

8 • GRANT SELECT ON LangLearn.userprogress TO 'User'@'%';
9 • GRANT SELECT ON LangLearn.achievements TO 'User'@'%';
10
11 -- Show grants for the two
12 • SHOW GRANTS FOR 'Instructor'@'%';
13 • SHOW GRANTS FOR 'User'@'%';

```

Result Grid Filter Rows: Exports: Wrap Cell Content: 11

Grants for User@%

```

GRANT USAGE ON *.* TO 'User'@'%'
GRANT SELECT ON 'langlearn'.'achievements' TO 'User'@'%'
GRANT SELECT ON 'langlearn'.'lessons' TO 'User'@'%'
GRANT SELECT ON 'langlearn'.'userprogress' TO 'User'@'%'
GRANT SELECT ON 'langlearn'.'vocabulary' TO 'User'@'%'

```

Output

Action Output

#	Time	Action	Message	Duration / Fetch
13	13:19:19	GRANT SELECT, INSERT, UPDATE, DELETE ON LangLearn.vocabulary TO 'Instructor'@'%'	0 row(s) affected	0.000 sec
14	13:19:19	GRANT SELECT ON LangLearn.lessons TO 'User'@'%'	0 row(s) affected	0.016 sec
15	13:19:19	GRANT SELECT ON LangLearn.vocabulary TO 'User'@'%'	0 row(s) affected	0.000 sec
16	13:19:19	GRANT SELECT ON LangLearn.userprogress TO 'User'@'%'	0 row(s) affected	0.000 sec
17	13:19:19	GRANT SELECT ON LangLearn.achievements TO 'User'@'%'	0 row(s) affected	0.000 sec
18	13:20:24	SHOW GRANTS FOR 'Instructor'@'%'	3 row(s) returned	0.000 sec / 0.000 sec
19	13:20:24	SHOW GRANTS FOR 'User'@'%'	5 row(s) returned	0.000 sec / 0.000 sec

Read Only Context Help Snippets

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

25°C Mostly cloudy 1:22 PM 11/26/2023

MySQL Workbench

LangLearn x

File Edit View Query Database Server Tools Scripting Help

Navigator: SCHEMAS

Filter objects

394_fest_db
394_festdb_lab1
art
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fest_database
langlearn

Tables
achievement
achievements
exercise
exercises
grammar_rule
grammars
language
languages

Administration Schemas

Schema: langlearn

Query 1 SQL File 3*

Limit to 1000 rows

```

8 • GRANT SELECT ON LangLearn.userprogress TO 'User'@'%';
9 • GRANT SELECT ON LangLearn.achievements TO 'User'@'%';
10
11 -- Show grants for the two
12 • SHOW GRANTS FOR 'Instructor'@'%';
13 • SHOW GRANTS FOR 'User'@'%';

```

Result Grid Filter Rows: Exports: Wrap Cell Content: 11

Grants for Instructor@%

```

GRANT USAGE ON *.* TO 'Instructor'@'%'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'langlearn'.'vocabulary' TO 'Instructor'@'%'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'langlearn'.'lessons' TO 'Instructor'@'%'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'langlearn'.'userprogress' TO 'Instructor'@'%'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'langlearn'.'achievements' TO 'Instructor'@'%'

```

Output

Action Output

#	Time	Action	Message	Duration / Fetch
13	13:19:19	GRANT SELECT, INSERT, UPDATE, DELETE ON LangLearn.vocabulary TO 'Instructor'@'%'	0 row(s) affected	0.000 sec
14	13:19:19	GRANT SELECT ON LangLearn.lessons TO 'User'@'%'	0 row(s) affected	0.016 sec
15	13:19:19	GRANT SELECT ON LangLearn.vocabulary TO 'User'@'%'	0 row(s) affected	0.000 sec
16	13:19:19	GRANT SELECT ON LangLearn.userprogress TO 'User'@'%'	0 row(s) affected	0.000 sec
17	13:19:19	GRANT SELECT ON LangLearn.achievements TO 'User'@'%'	0 row(s) affected	0.000 sec
18	13:20:24	SHOW GRANTS FOR 'Instructor'@'%'	3 row(s) returned	0.000 sec / 0.000 sec
19	13:20:24	SHOW GRANTS FOR 'User'@'%'	5 row(s) returned	0.000 sec / 0.000 sec

Read Only Context Help Snippets

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

25°C Mostly cloudy 1:22 PM 11/26/2023

Function

```
mysql> CREATE FUNCTION GetUserDetails(userId INT)
-- RETURNS VARCHAR(255)
-- DETERMINISTIC
-- BEGIN
-- DECLARE result VARCHAR(255);
--
-- SELECT
--   CONCAT('User: ', u.username,
--         '\nCompleted Lessons: ', GROUP_CONCAT(l.title SEPARATOR ', '),
--         '\nAchievements: ', GROUP_CONCAT(a.name SEPARATOR ', '))
--   ) INTO result
-- FROM Users u
-- LEFT JOIN UserProgress up ON u.user_id = up.user_id
-- LEFT JOIN Lessons l ON up.lss_id = l.lss_id
-- LEFT JOIN Achievements a ON u.user_id = a.user_id
-- WHERE u.user_id = userId
-- GROUP BY u.user_id; -- Include all non-aggregated columns in GROUP BY
--
-- IF result IS NULL THEN
--   SET result = 'User not found';
-- END IF;
--
-- -- Ensure the result is treated as VARCHAR
-- SET result = CAST(result AS CHAR);
--
-- RETURN result;
-- END //
```

Query OK, 0 rows affected (0.01 sec)

```
mysql> select GetUserDetails(2);
+-----+
| GetUserDetails(2) |
+-----+
| User: naj_patel
Completed Lessons: Greetings
Achievements: Beginner Language Learner |
+-----+
1 row in set (0.00 sec)

mysql>
```

The screenshot shows the MySQL Workbench interface. The 'Schemas' panel on the left lists various databases, with 'langlearn' selected. The 'Query Editor' in the center contains the following SQL code:

```
30 RETURN result;
31 END //
32
33 DELIMITER ;
34 SELECT GetUserDetails(1);
35
```

The 'Output' panel at the bottom displays the execution results:

#	Time	Action	Message	Duration / Fetch
1	13:13:37	CREATE FUNCTION GetUserDetails(userId INT) RETURNS VARCHAR(255) DETERMINISTIC	Error Code: 1046. No database selected Select the default DB to be used by double-clicking its...	0.000 sec
2	13:14:20	use LangLearn	0 row(s) affected	0.000 sec
3	13:14:29	CREATE FUNCTION GetUserDetails(userId INT) RETURNS VARCHAR(255) DETERMINISTIC	0 row(s) affected	0.016 sec
4	13:14:51	SELECT GetUserDetails(3) LIMIT 0, 1000	1 row(s) returned	0.016 sec / 0.000 sec
5	13:15:04	SELECT GetUserDetails(1) LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec

The 'Form Editor' shows the details for the 'GetUserDetails(1)' query, displaying the user 'anya_yarma', completed lessons 'Greetings', and achievements 'Vocabulary Master'.