



Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Fall, Year:2024), B.Sc. in CSE (Day)

Lab Report NO: 01
Course Title: Database System Lab
Course Code: CSE 210 Section:231(D1)

Lab Experiment Name: Implementation of Integrity Constraints in MySQL

Student Details

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Lab Date : 23-09-2024
Submission Date : 29-09-2024
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Lab Report Status

Marks:
Comments:.....

Signature:.....
Date:.....

❖ TITLE OF THE LAB REPORT EXPERIMENT

Implementation of Integrity Constraints in MySQL

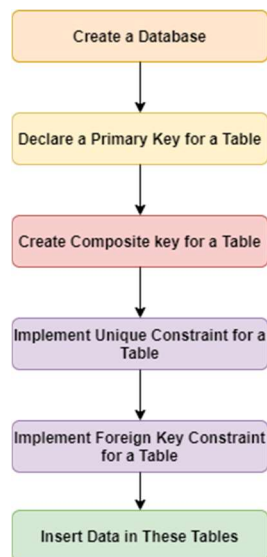
❖ OBJECTIVES

To Declare Primary Key

- To Create Composite Key
- To Implement Unique Constraint
- To Implement Foreign Key Constraint

❖ PROBLEM ANALYSIS

In the previous lab, we have already created databases, and tables and used them. In this lab, we have to declare the primary key, create the composite key, and implement unique and foreign key constraints. For these purposes, we have to create a database first. You can also use a database that has already been created in the previous lab. Then, we have to create a table with a primary key. In the next, we have to create composite keys and implement unique and foreign key constraints for a table. Finally, we have to insert tuples in the tables. Workflow of this



lab is as in the figure 1.

❖ IMPLEMENTATION

▪ Database Creation

To create a database, we have to write command like "CREATE DATABASE [Database_Name]".

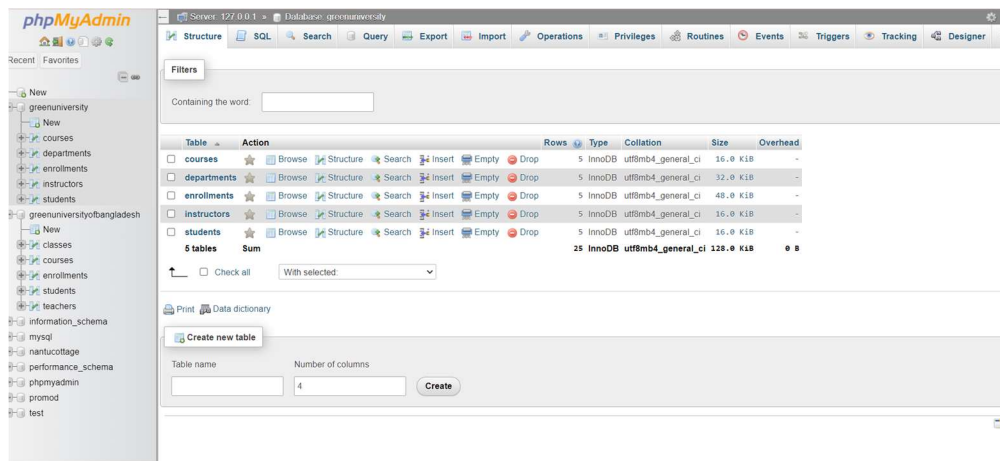


Figure 2: Session in Localhost

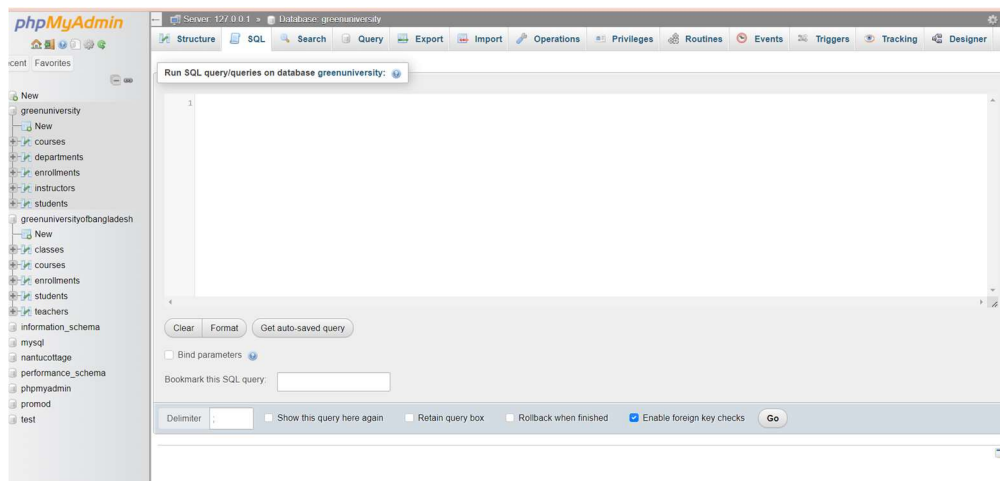


Figure 3: Space for Editing Commands

■ Declaration of Primary Key

Now, to create a table named "**Players**" in database **lab3** with attributes like **player_no (int)**, **player_name (varchar)**, **league_no (char)** where **player_no** would be the **Primary key**,

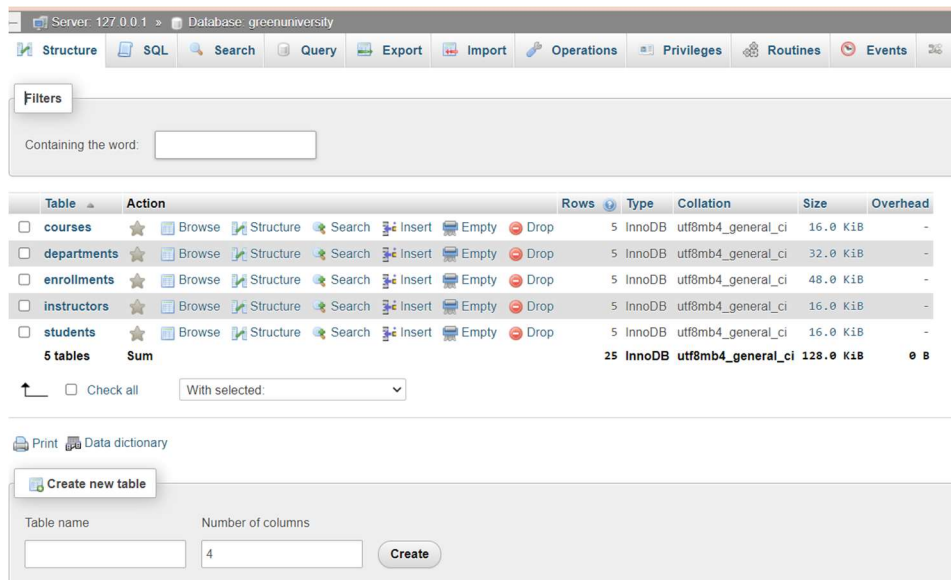


Figure 4: Description of Table

❖ Submit as a report

Lab Report(1=Create a database with including 5 tables, Inserted 5 data, Maintain PK and FK)

Answer to the q no:

Database Structure

Tables and Attributes

1. Students

- student_id (PK) - INT
- first_name - VARCHAR(50)
- last_name - VARCHAR(50)
- email - VARCHAR(100)

2. Courses

- course_id (PK) - INT
- course_name - VARCHAR(100)
- credits - INT

3. Instructors

- instructor_id (PK) - INT
- first_name - VARCHAR(50)
- last_name - VARCHAR(50)
- email - VARCHAR(100)

4. Enrollments

- enrollment_id (PK) - INT
- student_id (FK) - INT
- course_id (FK) - INT
- grade - VARCHAR(2)

5. Departments

- department_id (PK) - INT
- department_name - VARCHAR(100)
- head_instructor_id (FK) - INT

Relationships

- Enrollments links Students and Courses through foreign keys.
- Departments connects to Instructors via the head instructor's ID.

The screenshot shows the phpMyAdmin interface for a database named 'greenuniversity'. The top navigation bar includes tabs for Structure, SQL, Search, Query, Export, Import, Operations, Privileges, Routines, Events, and Tools. Below the navigation bar is a 'Filters' section with a text input field labeled 'Containing the word:'. The main area displays a table list with columns: Table, Action, Rows, Type, Collation, Size, and Overhead. The table list includes 'courses', 'departments', 'enrollments', 'instructors', and 'students', each with a 'Sum' row. The 'Sum' row shows 25 rows, InnoDB type, utf8mb4_general_ci collation, 128.0 KiB size, and 0 B overhead. Below the table list is a 'Create new table' section with a 'Table name' input field, a 'Number of columns' input field set to 4, and a 'Create' button. The bottom section shows the date and time '9/28/24, 5:05 PM' and the host 'localhost / 127.0.0.1'. Below this is another 'Filters' section with a text input field labeled 'Containing the word:'. At the bottom is a table description for 'Table (01)' with columns: Table, Rows, Type, Collation, Size, and Overhead. The table description shows the same data as the table list.

Table	Rows	Type	Collation	Size	Overhead
courses	5	InnoDB	utf8mb4_general_ci	16.0 KiB	-
departments	5	InnoDB	utf8mb4_general_ci	32.0 KiB	-
enrollments	5	InnoDB	utf8mb4_general_ci	48.0 KiB	-
instructors	5	InnoDB	utf8mb4_general_ci	16.0 KiB	-
students	5	InnoDB	utf8mb4_general_ci	16.0 KiB	-
5 tables	25	InnoDB	utf8mb4_general_ci	128.0 KiB	0 B

Figure 05 : Description of Table (01)

Server: 127.0.0.1 Database: greenuniversity Table: students

Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.)

SELECT * FROM `students`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Extra options

	student_id	first_name	last_name	email	Department
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	Promod	Das	promodd23@greenuniversity.edu	cse
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Prosen	Niloy	ProsenNiloy@greenuniversity.edu	cse
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Omor	Faruk	OmorFaruk@greenuniversity.edu	cse
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Nahid	Parbej	NahidParbej@greenuniversity.edu	cse
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	Amitesh	Boral	AmiteshBoral@greenuniversity.edu	cse

Check all With selected: Edit Copy Delete Export

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Query results operations

Print Copy to clipboard Export Display chart Create view

Bookmark this SQL query

Showing rows 0 - 4 (5 total, Query took 0.0004 seconds.)

SELECT * FROM `students`

student_id	first_name	last_name	email	Department
1	Promod	Das	promodd23@greenuniversity.edu	cse
2	Prosen	Niloy	ProsenNiloy@greenuniversity.edu	cse
3	Omor	Faruk	OmorFaruk@greenuniversity.edu	cse
4	Nahid	Parbej	NahidParbej@greenuniversity.edu	cse
5	Amitesh	Boral	AmiteshBoral@greenuniversity.edu	cse

Figure 06 : Description Student of Table (o2)

Server: 127.0.0.1 Database: greenuniversity Table: instructors

Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.)

SELECT * FROM `instructors`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Extra options

	instructor_id	first_name	last_name	email
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	Al	Maksud	Al.Maksud@greenuniversity.edu
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Dr Md Monirul	Islam	Monirul.islam@greenuniversity.edu
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Fatema-Tuj	Johora	Tuj.Johora@greenuniversity.edu
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Sakib Abdul	Ahad	Ahad@greenuniversity.edu
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	Sharmin	islam	sharmin.islama@greenuniversity.edu

Check all With selected: Edit Copy Delete Export

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Query results operations

Print Copy to clipboard Export Display chart Create view

9/28/24, 5:11 PM localhost / 127.0.0.1 / greenuniversity / instructors | php

Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.)

SELECT * FROM `instructors`

instructor_id	first_name	last_name	email
1	Al	Maksud	Al.Maksud@greenuniversity.edu
2	Dr Md Monirul	Islam	Monirul.islam@greenuniversity.edu
3	Fatema-Tuj	Johora	Tuj.Johora@greenuniversity.edu
4	Sakib Abdul	Ahad	Ahad@greenuniversity.edu
5	Sharmin	islam	sharmin.islama@greenuniversity.edu

Figure 07 : Description instructors of Table (03)

Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.)

SELECT * FROM `courses`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Extra options

	course_id	course_name	credits
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	CSE	144
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	EEE	142
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	TEX	140
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Software	142
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	AI	140

☐ Check all | With selected: ☐ Edit ☐ Copy ☐ Delete ☐ Export

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Query results operations

☐ Print ☐ Copy to clipboard ☐ Export ☐ Display chart ☐ Create view

Showing rows 0 - 4 (5 total, Query took 0.0002 seconds.)

SELECT * FROM `courses`

course_id	course_name	credits
1	CSE	144
2	EEE	142
3	TEX	140
4	Software	142
5	AI	140

Figure 08: Description Courses of Table (04)

Showing rows 0 - 4 (5 total, Query took 0.0002 seconds.)

SELECT * FROM `enrollments`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Extra options

	enrollment_id	student_id	course_id	grade
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2002008	4	3	A
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	231002002	2	4	B
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	231002005	1	1	A
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	231002006	3	2	A
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	231002009	5	5	C

☐ Check all | With selected: ☐ Edit ☐ Copy ☐ Delete ☐ Export

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Query results operations

Showing rows 0 - 4 (5 total, Query took 0.0005 seconds.)

SELECT * FROM `enrollments`

enrollment_id	student_id	course_id	grade
2002008	4	3	A
231002002	2	4	B
231002005	1	1	A
231002006	3	2	A
231002009	5	5	C

Figure 09: Description enrollments of Table (05)

Showing rows 0 - 4 (5 total, Query took 0.0003 seconds.) [head_instructor_id: 5... - 1...]

```
SELECT * FROM `departments` ORDER BY `head_instructor_id` DESC
```

Extra options

department_id	department_name	head_instructor_id
203	CSE	5
202	EEE	4
210	CSE	3
205	CSE	2
201	EEE	1

Query results operations

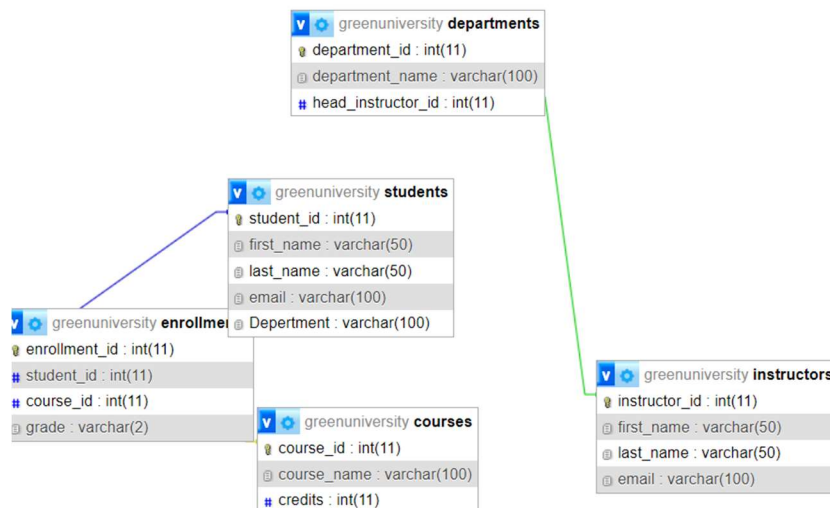
Print Copy to clipboard Export Display chart Create view

Showing rows 0 - 4 (5 total, Query took 0.0004 seconds.) [head_instructor_id: 5... - 1...]

```
SELECT * FROM `departments` ORDER BY `head_instructor_id` DESC
```

department_id	department_name	head_instructor_id	1
203	CSE	5	5
202	EEE	4	4
210	CSE	3	3
205	CSE	2	2
201	EEE	1	1

Figure 10: Description Department of Table (05)



❖ ANALYSIS AND DISCUSSION

Integrity constraints in MySQL ensure data accuracy and consistency within relational databases. Key types include primary keys (unique identifiers), foreign keys (maintaining relationships), unique constraints (preventing duplicates), not null constraints (ensuring data presence), and check constraints (enforcing specific conditions). Implementing these constraints during table creation helps maintain data integrity, reduces errors, and supports reliable relationships between tables. Effective use of integrity constraints is essential for robust database design and performance.