

```
import csv

import random

num_tuples = 2000

field_names = ['dept_num', 'dept_name', 'numemp', 'manager_id']

file_path = 'department_data.csv'

used_dept_nums = set()

with open(file_path, 'w', newline='') as csvfile:

    writer = csv.DictWriter(csvfile, fieldnames=field_names)

    writer.writeheader()

    for _ in range(num_tuples):

        while True:

            dept_num = random.randint(1000, 9999)

            dept_name = random.choice(["Data science", "Machine learning", "Databases", "Software engineering"])

            numemp = random.randint(10, 100)

            manager_id = random.randint(111111111, 888888888)

            if dept_num not in used_dept_nums:

                used_dept_nums.add(dept_num)

                writer.writerow({'dept_num': dept_num, 'dept_name': dept_name, 'numemp': numemp, 'manager_id': manager_id})

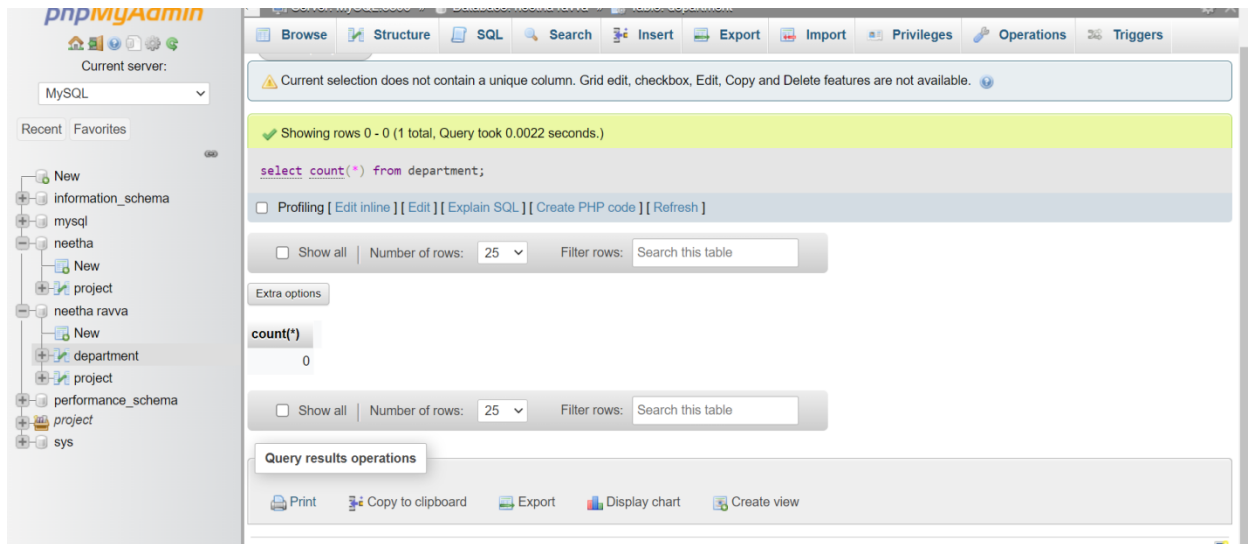
                break

print(f"Generated {num_tuples} tuples with distinct dept_num and saved to {file_path}")
```

dept_num	dept_name	numemp	manager_id		
4119	Databases	61	836794697		
2403	Machine learning	72	598606470		
8413	Machine learning	32	332163712		
3751	Data science	98	199203378		
8182	Databases	74	824886315		
1394	Databases	81	723674369		
7627	Databases	87	709704551		
3244	Databases	19	769078550		
4847	Machine learning	93	197443281		
8401	Machine learning	83	230931837		
9265	Databases	99	201279509		
2900	Software engineering	69	783146798		
1469	Data science	71	616644000		
8100	Software engineering	28	346984473		
7611	Machine learning	85	420041371		
7051	Data science	22	783858307		
9698	Machine learning	83	289929108		
1257	Databases	33	239264459		
8941	Software engineering	27	885447710		

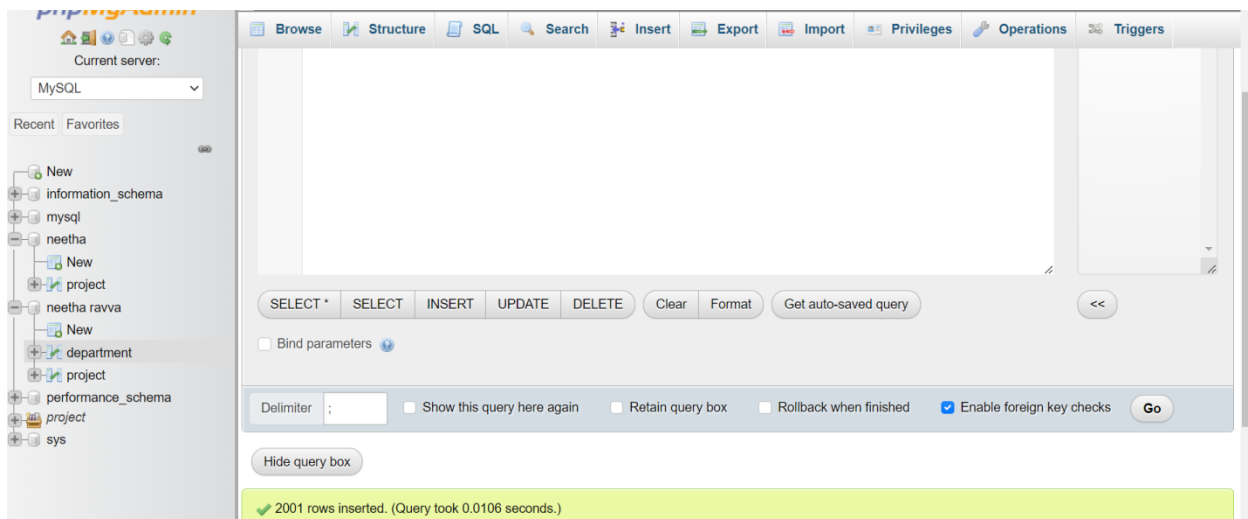
1982	9026	Machine learning	10	843973164		
1983	4485	Databases	89	766453885		
1984	8921	Machine learning	55	758724839		
1985	2795	Software engineering	77	614411744		
1986	3265	Software engineering	93	122147288		
1987	1164	Software engineering	84	635225249		
1988	9336	Software engineering	43	291505558		
1989	2793	Data science	22	859017426		
1990	6817	Machine learning	50	686713216		
1991	9932	Databases	43	880065108		
1992	7636	Databases	45	403132717		
1993	1569	Data science	20	390863821		
1994	3471	Databases	22	644434544		
1995	2390	Databases	56	225648656		
1996	3304	Databases	100	663235912		
1997	1649	Databases	78	664520295		
1998	7017	Data science	72	720372763		
1999	9155	Data science	66	583493466		
2000	5291	Machine learning	29	395980316		
2001	2382	Databases	84	457474319		

Before Loading:

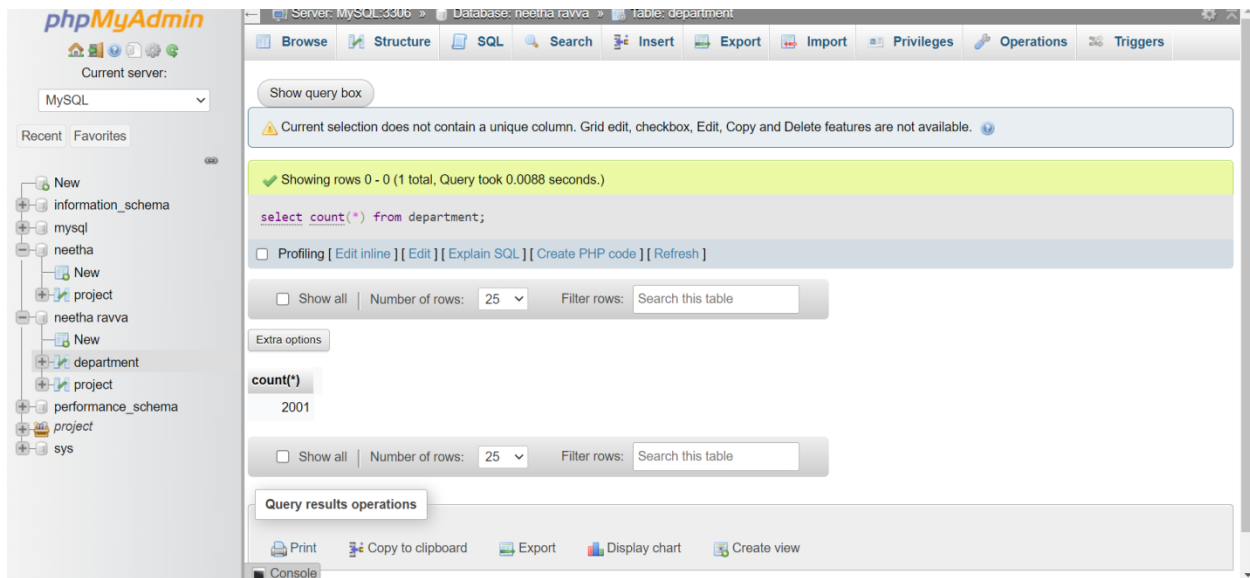


After Inserting rows:

LOAD DATA INFILE "C:/wamp64/tmp/Department_Data.csv" INTO TABLE department FIELDS TERMINATED BY ',' ENCLOSED BY '"' LINES TERMINATED BY '\n' ;

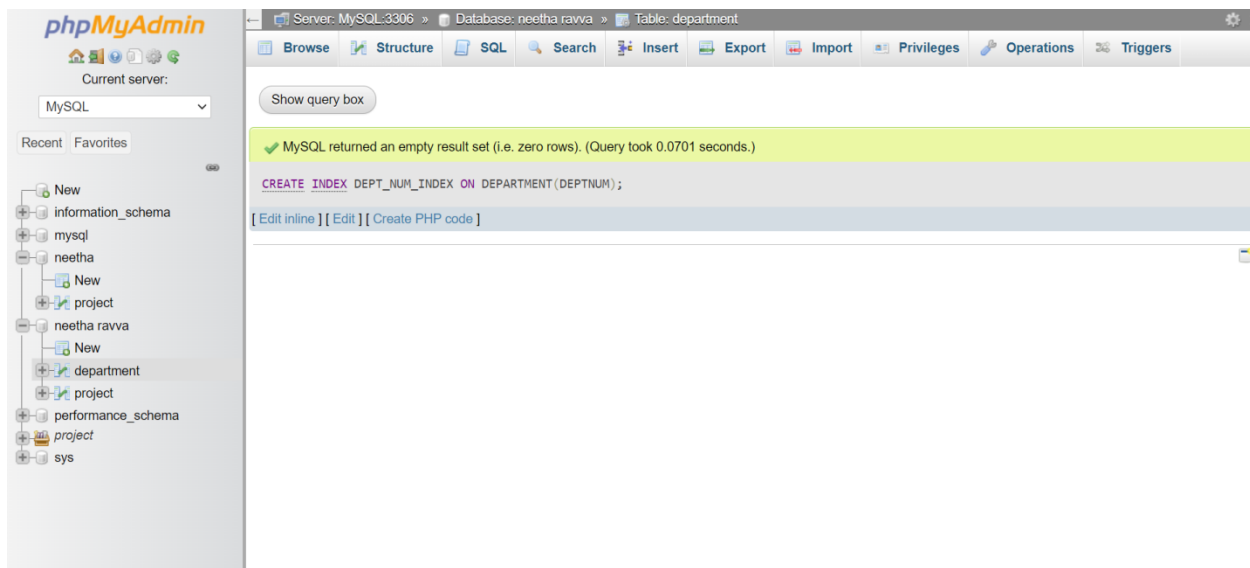


After Loading:



Creating an Index:

CREATE INDEX DEPT_NUM_INDEX ON DEPARTMENT(DEPTNUM) ;



select * from department where deptnum = 8413;

phpMyAdmin interface showing a query result for the 'department' table. The query executed is:

```
select * from department where deptnum = 8413;
```

The result shows one row:

DEPTNUM	DEPTNAME	NUMEMP	MANAGER_ID
8413	Machine learning	32	332163712

Below the table, the 'Query results operations' section includes options like Print, Copy to clipboard, Export, Display chart, and Create view.

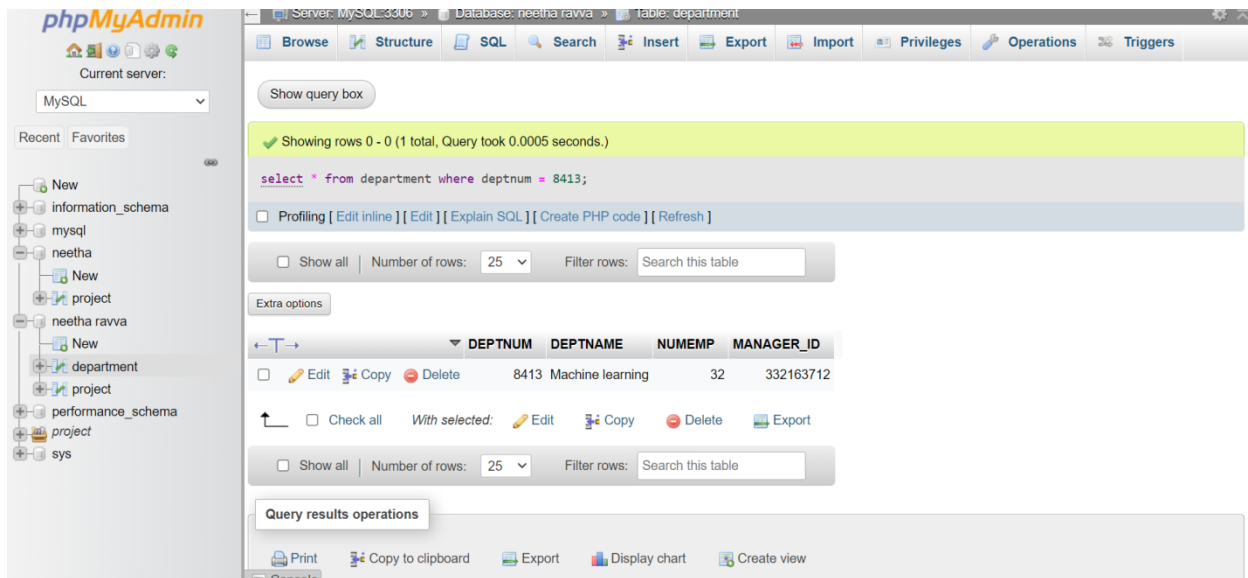
Dropping the Index Created:

phpMyAdmin interface showing the execution of a SQL command to drop an index. The query executed is:

```
DROP INDEX DEPT_NUM_INDEX ON DEPARTMENT;
```

The message indicates: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0617 seconds.)"

select * from department where deptnum = 8413;



Sorting and Grouping: Indexes can be used to speed up the sorting and grouping of data. They allow the database to avoid time-consuming sorting operations by reading data in the order specified by the index.

Efficient Joins: When you join multiple tables, indexes on the join columns can greatly speed up the process. The database can use these indexes to locate the corresponding rows in each table, improving the overall query performance.

In the above screenshot, the running time is 0.0005 seconds without an index the running time is 0.0003 seconds.

4)Creating a View:

```
CREATE VIEW Department_View AS
SELECT deptnum,deptname,manager_id
FROM department;
```

phpMyAdmin

Current server: MySQL

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Browse Structure SQL Search Insert Export Import Privileges Operations Triggers

SELECT * SELECT INSERT UPDATE DELETE Clear Format Get auto-saved query

☐ Bind parameters

Delimiter ; ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks Go

Hide query box

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0038 seconds.)

```
CREATE VIEW Department_View AS SELECT deptnum,deptname,manager_id FROM department;
```

[Edit inline] [Edit] [Create PHP code]

Select * from department_view where deptnum = 8413;

phpMyAdmin

Current server: MySQL

Recent Favorites

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 - New
 - department_view
 - performance_schema
 - project
 - sys

Browse Structure SQL Search Insert Export Privileges Operations

Show query box

Current selection does not contain a unique column. Grid edit, Edit, Copy and Delete features may result in undesired behavior.

Showing rows 0 - 0 (1 total, Query took 0.0010 seconds.)

```
select * from department_view where deptnum = 8413;
```

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

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Extra options

	deptnum	deptname	manager_id
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	8413	Machine learning	332163712

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

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Query results operations

Dropping the view:

The screenshot shows the phpMyAdmin interface. On the left, the database structure tree is visible, showing the 'neetha' database with a 'department' table. The main panel displays the SQL query: `drop view department_view;`. A green message bar at the top of the query area states: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0020 seconds.)". Below the query, there are links for "[Edit inline]", "[Edit]", and "[Create PHP code]".

Select * from department where deptnum = 8413;

The screenshot shows the phpMyAdmin interface with the same database structure. The main panel displays the SQL query: `Select * from department where deptnum = 8413;`. A green message bar at the top of the query area states: "Showing rows 0 - 0 (1 total, Query took 0.0004 seconds.)". Below the query, there are links for "[Profiling]", "[Edit inline]", "[Edit]", "[Explain SQL]", "[Create PHP code]", and "[Refresh]". The query results are displayed in a table with the following columns: DEPTNUM, DEPTNAME, NUMEMP, and MANAGER_ID. The table contains one row with the following data: 8413, Machine learning, 32, 332163712. Below the table, there are links for "[Edit]", "[Copy]", "[Delete]", and "[Export]". At the bottom, there are links for "[Print]", "[Copy to clipboard]", "[Export]", "[Display chart]", and "[Create view]".

DEPTNUM	DEPTNAME	NUMEMP	MANAGER_ID
8413	Machine learning	32	332163712

phpMyAdmin

Current server: MySQL

Recent Favorites

- New
- information_schema
- mysql
- neetha
 - New
 - project
- neetha ravva
 - Tables
 - New
 - department
 - project
 - Views
- performance_schema
- project
- sys

Server: MySQL:3306 » Database: neetha ravva » Table: department

Browse Structure SQL Search Insert Export Import Privileges Operations Triggers

Show query box

✓ 1 row affected. (Query took 0.0045 seconds.)

```
update department_view set numemp = 76 where deptnum = 8413;
```

[Edit inline] [Edit] [Create PHP code]

After update:

phpMyAdmin

Current server: MySQL

Recent Favorites

- New
- information_schema
- mysql
- neetha
 - New
 - project
- neetha ravva
 - Tables
 - New
 - department
 - project
 - Views
 - New
 - department_view
- performance_schema
- project
- sys

Server: MySQL:3306 » Database: neetha ravva » View: department_view

Browse Structure SQL Search Insert Export Privileges Operations

Show query box

⚠ Current selection does not contain a unique column. Grid edit, Edit, Copy and Delete features may result in undesired behavior.

✓ Showing rows 0 - 0 (1 total, Query took 0.0005 seconds.)

```
select * from department_view where deptnum = 8413;
```

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

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Extra options

	deptnum	deptname	numemp
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	8413	Machine learning	76

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

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Query results operations