SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur-603203.

DEPARTMENT OF COMPUTER APPLICATIONS

LAB MANUAL

MC4166 DATABASE TECHNOLOGIES LABORATORY

ACADEMIC YEAR 2025-2026

(ODD SEMESTER)

FIRST SEMESTER

Prepared By

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MC4266 FULL STACK WEB DEVELOPMENT LABORATORY L T P C

0 0 4 2

COURSE OBJECTIVES:

- To implement the client side of the web application using javascript.
- To understand Javascript on the desktop using NodeJS.
- To develop a web application using NodeJS and Express.
- To implement a SPA using React.
- To develop a full stack single page application using React, NodeJS, and aDatabase (MongoDB or SQL).

LIST OF EXPERIMENTS:

1. Create a form and validate the contents of the form using JavaScript.
2. Get data using Fetch API from an open-source endpoint and display the contents in the form of a card.
3. Create a NodeJS server that serves static HTML and CSS files to the user without usingExpress.
4. Create a NodeJS server using Express that stores data from a form as a JSON file and displays it in another page. The redirect page should be prepared using Handlebars.
5. Create a NodeJS server using Express that creates, reads, updates and deletes students' details and stores them in MongoDB database. The information about the usershould be obtained from a HTML form.
6. Create a NodeJS server that creates, reads, updates and deletes event details and storesthem in a MySQL database. The information about the user should be obtained from a HTML form.
7. Create a counter using ReactJS
8. Create a Todo application using ReactJS. Store the data to a JSON file using a simple NodeJS server and retrieve the information from the same during page reloads.
9. Create a simple Sign up and Login mechanism and authenticate the user using cookies. The user information can be stored in either MongoDB or MySQL and the server shouldbe built using NodeJS and Express Framework.
10. Create and deploy a virtual machine using a virtual box that can be accessed from the host computer using SSH.

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11. Create a docker container that will deploy a NodeJS ping server using the NodeJS image.

TOTAL: 60 PERIODS

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE REQUIREMENTS

1. Java / Python / R / Scala
2. Oracle, MySQL, MongoDB, Casandra, Hive

COURSE OUTCOMES:

On completion of the course, the student will be able to:

CO1: *Design and implement advanced databases.*

CO2: *Use big data frameworks and tools.*

CO3: *Formulate complex queries using SQL.*

CO4: *Create an XML document and perform Xquery.*

CO5: *Query processing in Mobile databases using open source tools.*

PROGRAMME EDUCATIONAL COURSE OBJECTIVES (PEOs):

1. To prepare students with a breadth of knowledge to comprehend, analyze, design, and create computing solutions to real-life problems and to excel in industry / technical profession.
2. To provide students with a solid foundation in mathematical and computing fundamentals and techniques required to solve technology-related problems and to pursue higher studies and research.
3. To inculcate a professional and ethical attitude in students, to enable them to work towards a broad social context.
4. To empower students with skills required to work as members and leaders in multidisciplinary teams and with continuous learning ability on technology and trends needed for a successful career.

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PROGRAM OUTCOMES (POs) MASTER'S IN COMPUTER APPLICATIONS GRADUATES WILL BE ABLE TO:

PO#	PROGRAMME COURSE OUTCOMES
1.	An ability to independently carry out research/investigation and development work to solve practical problems.
2.	An ability to write and present a substantial technical report/document.
3.	An ability to demonstrate a degree of mastery over the design and development of computer applications.
4.	An ability to create, select, adapt and apply appropriate innovative techniques, resources, and modern computing tools to complex computing activities with an understanding of the limitations.
5.	An ability to recognize the need and to engage in independent learning for continual development as a computing professional.
6.	An ability to function effectively as an individual and as a member/leader of a team in various technical environments.

PROGRAM SPECIFIC OUTCOMES (PSOs):

1) **Database Administrator**: Responsible for planning, design and development of database applications including installing, configuring, upgrading, monitoring, maintaining and security of databases in an organization.
2) **Developer/Programmer:** Design and develop and software solutions for modern business environments with the help of advanced computing technologies and programming tools.
3) **Network Administrator**: Design, plan and setting up the network that is helpful in contemporary business environments.
4) **Software Engineer/Tester**: Planning, defining test activities and preparing test cases that can identify errors using predefined procedures and ensure that the product maintains quality.

COURSE OUTCOMES:

Course Name:

MC4166&DTL

Lab Year of Study:2024-2025

MC4166.1	Use distributing tables across multiple systems.
MC4166.2	Storing, retrieving spatial and temporal data

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MC4166.3	Storing, retrieving objects in a database
MC4166.4	Implement storing and retrieving data from a XML Database
MC4166.5	Design the open-source database for building a mobile application

CO- PO MATRIX

CO	**POs**					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
1	2	1	2	2	2	2
2	2	1	2	2	2	2
3	2	1	2	2	2	2
4	2	1	2	2	2	2
5	2	1	2	2	2	2
Avg	2	1	2	2	2	2

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INTERNAL ASSESSMENT FOR LABORATORY

S.No	**Description**	**Mark**
1.	Execution	30
2.	Record	10
3	Model Exam	20
	Total	60

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Ex.No:01	NOSQL Commands using MONGO DB,CASSANDRA,HIVE,ORIENTDB

A) MONGODB

AIM:

To write NOSQL QUERIES to understand the concept of Open Source Database Management System such as Mongo DB.

PROCEDURE:

Step 1: Start the MongoDB Server (Mongos).
Step 2: Start the Client (Mongod)
Step 3: Perform the MongoDB Curd Operations such as (Create, Update,Read,Delete). Syntax: To Create/Select a Collection: USE DATABASE_NAME.
Syntax: To Insert: DB.COLLECTION_NAME.INSERT(DOCUMENT).
Syntax: To Update: DB.COLLECTION_NAME.UPDATE(<FILTER>, <UPDATE>)
Syntax: To Display/Search: DB.COLLECTION_NAME.FIND ()
Syntax: To Delete: DB.COLLECTION_NAME.REMOVE (DELETION_CRITERIA)
Step 4: Perform the MongoDB Indexing Operations is used to improve the speed of search
operations instead of searching the whole document.
Syntax: To Create Index: DB.COLLECTION_NAME.CREATE_INDEX({FIELD : VALUE })
Step 5: Perform the MongoDB Sharding Operations
Syntax TO SHARDING DB.COLLECTION_NAME.GETSHARDDISTRIBUTION()
Step 6: Perform the Deployment Operation in MongoDB
Syntax To Deployment: RS.INITIATE() to connect the other Replica machines.

QUERIES WITH EXECUTION:

Create:

```
> use vysya;
switched to db vysya
```

Insert:

```
> db.vysya.insert({
  course: "ADT",
  details: {
    lab: "6 months",
    Trainer: "Natarajan"
  },
  category: "Programming language"
})
WriteResult({ "nInserted" : 1 })
```

Update:

```
> db.vysya.update({'course':'ADT'},{$set:{'course':'Advance DataBase Technology'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
```

Find:

```
> db.vysya.find()
{
  "_id" : ObjectId("603fab366a8c1de1c3b4b7a1"),
  "course" : "Advance DataBase Technology",
  "details" : {
    "lab" : "6 months",
    "Trainer" : "Natarajan"
  },
  "category" : "Programming language"
}
```

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Delete:

```
> db.vysya.remove({ })
WriteResult({ "nRemoved" : 1 })
```

Indexing:

```
> db.vysya.createIndex({regNo : 1})
{
  "createdCollectionAutomatically" : false,
  "numIndexesBefore" : 1,
  "numIndexesAfter" : 2,
  "ok" : 1
}
```

Sharding:

```
> use vysya
switched to db vysya
> show collections
vysya
> db.createCollection("movie");
{ "ok" : 1 }
> db.createCollection("movie1");
{ "ok" : 1 }
> db.movie1.getShardDistribution()
Collection vysya.movie1 is not sharded.
> sh.enableSharding("vysya")
{ "ok" : 1 }
> sh.shardCollection("vysya.movie1", {"title":"Vis"})
{ "ok" : 1 }
> db.movie1.getShardDistribution()
Collection vysya.movie1 is sharded.
> sh.status()
Sharding Status
--- sharding version:
```

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```
{
  "_id" : 1,
  "version" : 4,
  "minCompatibleVersion" : 4,
  "currentVersion" : 5,
  "clusterId" : ObjectId("536c30b36eaf84a8336da659")
}
shards:
{ "_id" : "shard0000", "host" : "Natz:27000" }
{ "_id" : "shard0001", "host" : "Natz:27001" }
databases:
{
  "id" : "admin",
  "partitioned" : false,
  "primary" : "config"
}
Deployment:
> rs.status();
{ "ok" : 0, "errmsg" : "not running with --replSet", "code" : 76, "codeName" :
"NoReplicationEnabled" }
> rs.initiate({
  _id: "rs0",
  members: [
    { _id: 0, host: "mongodb0:27017" },
    { _id: 1, host: "mongodb1:27017" },
    { _id: 2, host: "mongodb2:27017" }
  ]
})
> exit
> mongo mongodb://mongodb0:27017,mongodb1:27017,mongodb2:27017
> mongo 'mongodb://mongodb0,mongodb1,mongodb2/?replicaSet=rs0'
> rs.printReplicationInfo()
```

RESULT:

Thus the above Mongo DB Queries has been executed successfully.

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B) CASSANDRA

AIM:

To write NOSQL QUERIES to understand the concept of Open Source Database Management System such as CASSANDRA.

PROCEDURE:

Step 1: Start the CASSANDRA Server (Cassandra) using CMD.

Step 2: Start the Client (CQLSH.py) using CMD.

Step 3: Perform the Cassandra Table Operation, Curd Operation and CQL Types.

Cassandra Table Operations:

1. Create Key Space in Cassandra. CREATE KEYSPACE <identifier> WITH <properties>
2. To Create Cassandra Table, Using Create Command.
3. To Change the structure of the table, Using Alter Command.
4. To delete the existing table in Cassandra, Using Truncate Command.
5. To Insert the values in CQL, use insert command
6. The SELECT command is used to read data from Cassandra table
7. The UPDATE command is used to update the existing data in a Cassandra.
8. The DELETE command is used to delete data from Cassandra table

Step 4 : Close the command prompt

Step 5 : Stop the Server

QUERIES WITH EXECUTION:

Create KeySpace:

```
cqlsh> CREATE KEYSPACE vysya WITH replication = {'class':'SimpleStrategy',
'replication_factor': 3};

cqlsh> describe keyspaces;
vysya1 system_auth system_distributed vysya system_schema system system_traces

cqlsh> use vysya;
```

Create Table:

```
cqlsh:vysya> CREATE TABLE VVT(Id int PRIMARY KEY, name text, city text, fees varint);
```

Alter Table:

```
cqlsh:vysya> ALTER TABLE VVT ADD email text;
```

View Table:

```
cqlsh:vysya> select * from vvt;
id | city | email | fees | name
----+------+-------+------+------
cqlsh:vysya> ALTER TABLE VVT DROP email;
cqlsh:vysya> select * from vvt;
id | city | fees | name
----+------+------+
```

Truncate Data:

```
cqlsh:vysya> TRUNCATE VVT;
cqlsh:vysya> INSERT INTO VVT(Id, fees, name, city) VALUES(1, 5000, 'Natarajan S',
'Namakkal');

cqlsh:vysya> select * from vvt;
id | city    | fees | name
```

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```
----+---------+------+-------------
1   | Namakkal | 5000 | Natarajan S
```

Update Data:

```
cqlsh:vysya> UPDATE VVT SET fees = 500, name = 'Natarajan S' WHERE id = 1;

cqlsh:vysya> select * from vvt;
id | city     | fees | name
----+---------+------+-------------
1   | Namakkal | 500  | Natarajan S
2   | Aathur   | 5000 | Rahul
3   | Salem    | 5000 | Partha
```

Delete Data:

```
cqlsh:vysya> DELETE FROM VVT WHERE id = 3;
cqlsh:vysya> select * from vvt;
id | city     | fees | name
----+---------+------+-------------
1   | Namakkal | 500  | Natarajan S
2   | Aathur   | 5000 | Rahul
```

Drop Table:

```
cqlsh:vysya> describe columnfamilies vvt
cqlsh:vysya> DROP TABLE VVT;
cqlsh:vysya> describe columnfamilies

<empty>
```

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RESULT:

Thus the above Hive Queries has been executed successfully

C) HIVE:

AIM:

To write NOSQL QUERIES to understand the concept of Open Source Database Management System such as HIVE.

PROCEDURE:

Step 1: Start the Hadoop Cluster from sbin Folder (Run start-dfs, start-yarn).
Step 2: Start the derby node using the command(StartNetworkServer -h 0.0.0.0)
Step 3: Then Start the Hive.(Hive command)
Step 4: Hive data types are categorized in numeric types, string types, misc types, and complex types.
Step 5: Syntax to Create a Database.first we have to check weather the DB is Already Exist or Not for that
show database;
Step 6: if Not Exist Create Database Database_Name;
Step 7: Perform Some Table Operations in Hive such as Create, Alter, Drop Table.
Step 8: Finally Partitioning the Hive

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QUERIES WITH EXECUTION:

```
hive> show databases;
OK
Default
Time taken: 0.271 seconds, Fetched: 1 row(s)

hive> create database demo;
OK
Time taken: 0.215 seconds

hive> create database if not exists demo;
OK
Time taken: 0.107 seconds

hive> create database demo WITH DBPROPERTIES('creator' = 'Natz', 'date' = '2019-06-
03');
OK
Time taken: 2.389 seconds

hive> create table demo.employee (Id int, Name string, Salary float);
OK
Time taken: 0.461 seconds

hive> select * from demo.employee;
OK
1   "NATARAJAN S"   30000.0
2   "SUNDAR S"      40000.0
3   "SURESH C"      50000.0
4   "MUNISH"        90000.0
```

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```
hive> describe demo.employee;
OK
id      int
Name    string
Salary  float
Time taken: 0.215 seconds
hive> alter table employee rename to employee_data;
OK
Time taken: 6.06 seconds
hive> describe employee_data;
OK
id      int
Name    string
Salary  float
Time taken: 0.275 seconds
hive> show tables;
OK
Employee
Employee_data
Time taken: 0.098 seconds, Fetched: 2 row(s)
hive> alter table employee_data add columns (age int);
OK
Time taken: 0.275 seconds
hive> show tables;
OK
employee
employee_data
Time taken: 0.098 seconds, Fetched: 2 row(s)

hive> drop table new_employee;
OK
```

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```
Time taken: 17.5 seconds
hive> show tables;
OK
emp
employee
Time taken: 0.098 seconds

hive> drop database demo;
OK
Time taken: 2.354 seconds
hive> use test;
hive> create table student (id int, name string, age int, institute string) partitioned by
(course string);
OK
Time taken: 3.054 seconds
hive> describe student;
OK
id      int
name    string
age     int
institute string
course  string
Time taken: 1.054 seconds, Fetched: 10 row(s)
hive> use show;
hive> set hive.exec.dynamic.partition=true;
hive> set hive.exec.dynamic.partition.mode=nonstrict;
hive> create table stud_demo(id int, name string, age int, institute string, course string);
OK

hive> load data local inpath 'd:/student_details' into table stud_demo;
Loading data to table show.stud_demo
Table show.stud_demo status: [numFiles=1, totalSize=152]
```

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```
hive> insert into student_part partition(course) select id, name, age, institute, course from
stud_demo;
Job ID = codegyani_20190801062015_d7649030 -£370 -47a2 -a86d -ff402d3e7de7
Total jobs = 3
Number of reduce tasks is set to 0 since there's no reduce operator

Starting Job = job_1555046592674_0017, Tracking URL =
http://ubuntu64server:8088/proxy/application_1555046592674_0017/
Command = /home/codegyani/hadoop-2.7.1/bin/hadoop job -kill
job_1555046592674_0017

MapReduce Job Information:
- Stage-1: number of mappers: 1, number of reducers: 0
- 2019-08-01 06:21:50,531 Stage-1 map = 0%, reduce = 0%
- 2019-08-01 06:22:51,598 Stage-1 map = 0%, reduce = 0%
- 2019-08-01 06:23:06,456 Stage-1 map = 100%, reduce = 0%, Cumulative CCU time: 10
seconds 30 cosec
- Ended Job = job_1555046592674_001
```

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RESULT:

Thus the above Hive Queries has been executed successfully

D) ORIENTDB:

AIM:

To write NOSQL QUERIES to understand the concept of Open Source Database Management System such as OrientDB Graph.

PROCEDURE:

Step1: Start the Server form the Orientdb Bin folder.

Step2: Use the respective url http://192.168.43.111:2480/studio/index.html to login to OrientDb browser.

Step3: Choose the Database and enter the username and password for the OrientDB Server.

Step4: In the Menu choose the Graph Tab.

Step5: Create a Class, Node, Edges and Insert the fields Finally connect the graph display the output.

Step6: Logout from the Browser.

Step7: Stop the Server

QUERIES WITH EXECUTION:

```
create class vysya extends v
create vertex vysya set name='ahmed',class='I_MCA'
create vertex vysya set name='bala',class='I_MCA'
create vertex vysya set name='partha',class='I_MCA'
create vertex vysya set name='praveen',class='I_MCA'
create vertex vysya set name='tamil',class='I_MCA'
create vertex vysya set name='ragul',class='I_MCA'
create edge from  #43:0 to #44:0
create edge from #43:0 to #45:0
create edge from #46:0 to #46:0
create edge from #43:1 to #44:0
create edge from #44:1 to #45:0
select *from  vysya;
```

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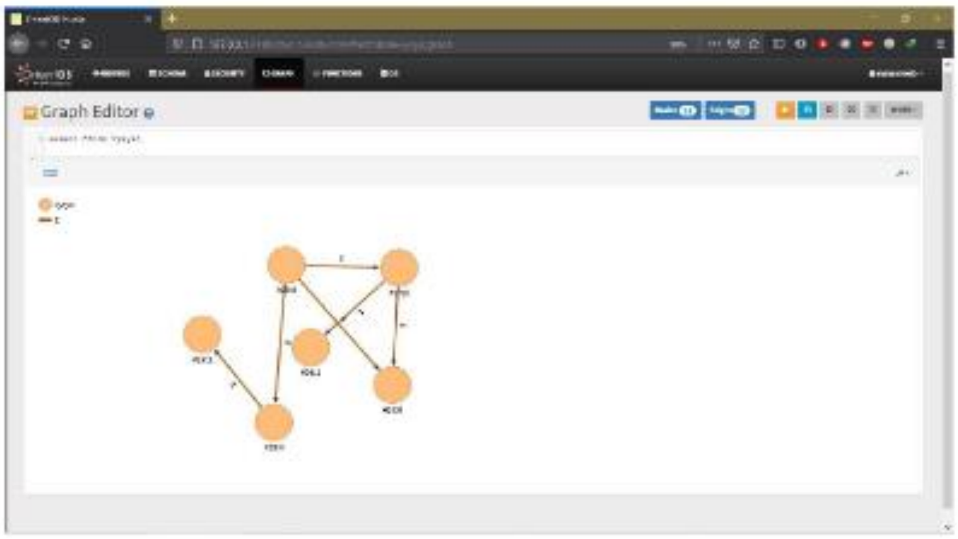
OUTPUT:



RESULT:

Thus the above Orient DB Queries has been executed successfully.

Ex.No:02	Database and Table Creation in MYSQL

AIM:

To write a Query for MySQL Database Creation, Table Creation and Some other Queries Execution.

PROCEDURE:

Step 1: Start the MYSQL Server.
Step 2: Open MySQL Command Line Client
Step 3: Write and Execute Queries for Database Creation
Step 4: Write and Execute Queries for Table Creation
Step 5: Verify with Show Command to Check whether the Database and Table Created.
Step 6: Do some other Queries Execution like insert, update, delete a record.
Step7: Close MySQL Command Line Client
Step 8:Stop the MYSQL Server.

SK

QUERIES WITH EXECUTION:

```
mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| test               |
+--------------------+
3 rows in set (0.00 sec)

mysql> CREATE DATABASE Vysya;
Query OK, 1 row affected (0.00 sec)

mysql> USE Vysya;
Database changed

mysql> CREATE TABLE MCA(
   id int NOT NULL AUTO_INCREMENT,
   name varchar(45) NOT NULL,
   Dept varchar(35) NOT NULL,
   age int NOT NULL,
   PRIMARY KEY (id)
);
Query OK, 0 rows affected (0.01 sec)

mysql> SHOW TABLES;
+-----------------+
| Tables_in_vysya |
+-----------------+
| mca             |
+------------------+
1 row in set (0.00 sec)

mysql> DESCRIBE mca;
+--------+-------------+------+-----+---------+----------------+
| Field  | Type        | Null | Key | Default | Extra          |
+--------+-------------+------+-----+---------+----------------+
| id     | int(11)     | NO   | PRI | NULL    | auto_increment |
| name   | varchar(45) | NO   |     | NULL    |                |
| Dept   | varchar(35) | NO   |     | NULL    |                |
| age    | int(11)     | NO   |     | NULL    |                |
+--------+-------------+------+-----+---------+----------------+
4 rows in set (0.01 sec)

mysql> ALTER TABLE MCA ADD Coll varchar(40) NOT NULL;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> INSERT INTO mca VALUES (102, 'Natarajan', 'cs', 30, 'vysya');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO mca VALUES (101, 'Munish', 'cs', 32, 'vysya');
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM mca;
+-----+----------+------+-----+-------+
| id  | name     | Dept | age | Coll  |
+-----+----------+------+-----+-------+
| 101 | Munish   | cs   | 32  | vysya |
| 102 | Natarajan| cs   | 30  | vysya |
+-----+----------+------+-----+-------+
2 rows in set (0.00 sec)
```

```
mysql> UPDATE MCA SET name = 'Munish', age = 36 WHERE id = 102;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> SELECT * FROM MCA;
+-----+----------+------+-----+-------+
| id  | name     | Dept | age | Coll  |
+-----+----------+------+-----+-------+
| 101 | Munish   | cs   | 32  | vysya |
| 102 | Munish   | cs   | 36  | vysya |
+-----+----------+------+-----+-------+
2 rows in set (0.00 sec)

mysql> DELETE FROM MCA WHERE id=102;
Query OK, 1 row affected (0.01 sec)

mysql> DROP TABLE mca;
Query OK, 0 rows affected (0.00 sec)

mysql> SELECT * FROM MCA;
ERROR 1146 (42S02): Table 'vysya.mca' doesn't exist

mysql> CREATE DATABASE Vysya;
Query OK, 1 row affected (0.00 sec)

mysql> SHOW CREATE DATABASE Vysya;
+---------+--------------------------------------------------------+
| Database | Create Database                                       |
+---------+--------------------------------------------------------+
| vysya   | CREATE DATABASE `vysya`  |
+---------+--------------------------------------------------------+
1 row in set (0.00 sec)
```

```
mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| test               |
| vysya              |
+--------------------+
4 rows in set (0.00 sec)

mysql> USE Vysya;
Database changed

mysql> DROP DATABASE Vysya;
Query OK, 0 rows affected (0.01 sec)
```

RESULT:

Thus the above MYSQSL Queries has been executed successfully.

Ex.No:03	Distributed Database Replication in MYSQL

AIM:

To apply MYSQL replication technique in Distributed database.

PROCEDURE:

Step 1: Software to be need to run this Replication

Java version 1.8 and above

MYSQL Server 8.05

WAMP Server

Step 2: Start the MYSQL Server and WAMP Server.

Step 3: Go to Browser in that type http://127.0.0.1/ Wamp Server Page will open.

Step 4: In the bottom select tools PHPMyAdmin it will redirect to

http://127.0.0.1/phpmyadmin/

Step 5: Type User Name as „Root" and Password „" and hit enter

Step 6: Create a Database, Table in MYSQL using PHPMYADMIN page.

Step 7: Need 2 MYSQL server, each running as a copy of PHPMyAdmin

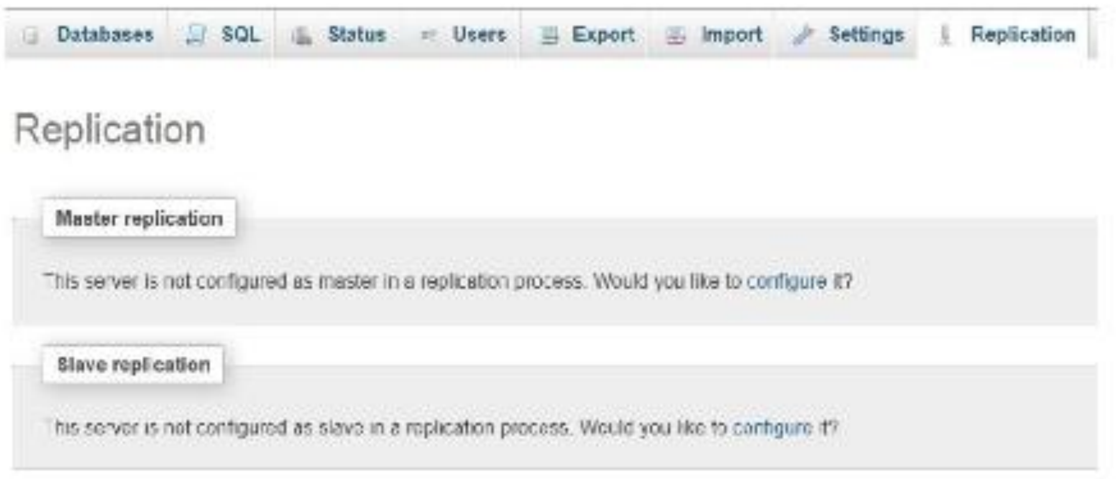
Step 8: Your primary Moodle Database is referred to as the "master", the replicated server will be referred to

as the "slave"

Step 9: Take an SQL dump of your master database and restore it on your slave database

Step 10: Now, on your master database log in to PHPMyAdmin and click the Replication Tab

<u>Replication Configuration:</u>



Replication

Master replication

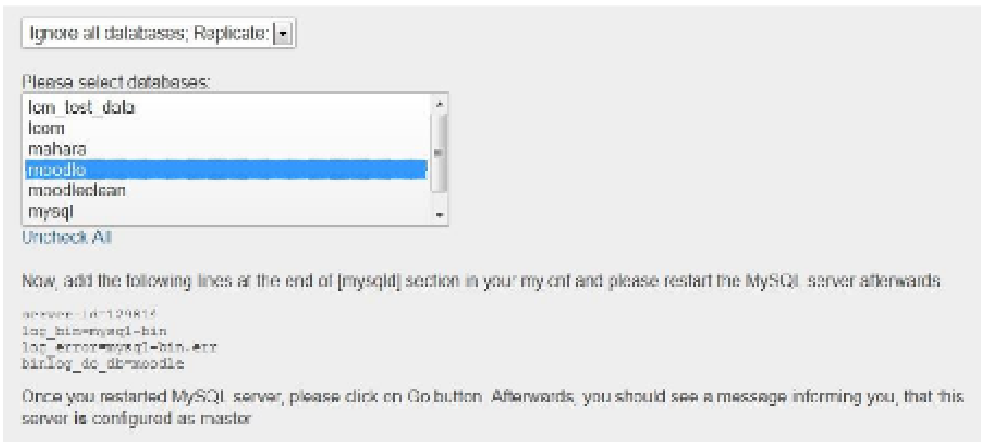
This server is not configured as master in a replication process. Would you like to configure it?

Slave replication

This server is not configured as slave in a replication process. Would you like to configure it?

Replication Step 1

1. Now click the link to configure this as the master server.
2. Select “Ignore all databases, replicate:”
3. Select your Moodle database from the available list (see below).



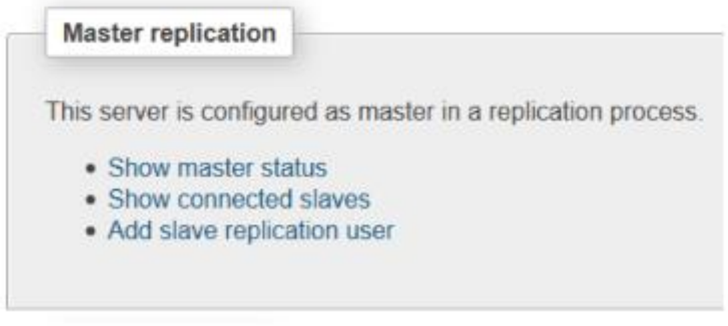
Now, add the following lines at the end of [mysqld] section in your my.cnf and please restart the MySQL server afterwards

```
server-id=129814
log_bin=mysql-bin
log_error=mysql-bin.err
binlog_do_db=moodle
```

Once you restarted MySQL server, please click on Go button. Afterwards, you should see a message informing you, that this server is configured as master

Replication Step 2

4. Copy and paste the code this screen provides into the very bottom of your MySQL config file (my.ini on Windows) AND add a line that says `binlog_format=ROW` (this fixes an error when running an external DB enrollment sync with replication).
5. Restart the MySQL services on the master server, leave PHPMyAdmin open though.
6. Once the service has restarted, click on “Go” on the PHPMyAdmin screen.
7. You will be redirected to the Replication screen which now looks like this.

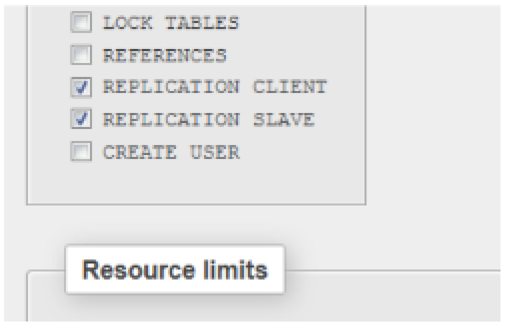


This server is configured as master in a replication process.

- Show master status
- Show connected slaves
- Add slave replication user

Replication Step 3

8. Lastly, we need to create a replication user so click on the link that says “Add slave replication user.”
9. Create a user and password, set the host to “Any” and click “Go.”
10. On the privileges screen ensure the new user has both replication permissions checked and click “Go.”



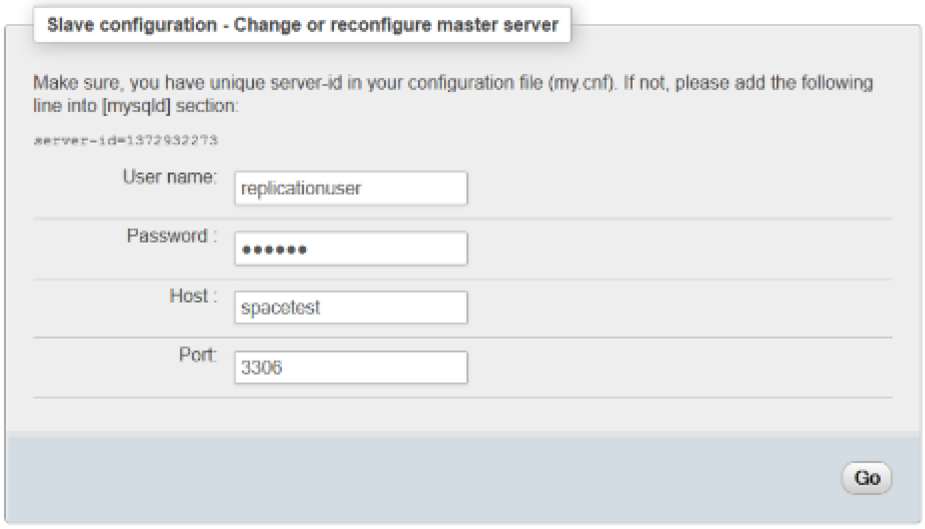
- [ ] LOCK TABLES
- [ ] REFERENCES
- [x] REPLICATION CLIENT
- [x] REPLICATION SLAVE
- [ ] CREATE USER

Replication Step 4

11. That’s all we need to do on the master server, now let's move over to the slave.
12. From within PHPMyAdmin on the slave, click the replication tab.
13. Then click the link to configure this server as slave replication.

PM-VEC

14. Copy the line of code that shows your new server id and paste this entire line into the MySQL config file on your slave database server.
15. Stop and start your MySQL service on the slave server.
16. Now in PHPMyAdmin enter the username of the replication user you created in step 13.
17. Enter the password and the host (the hostname of the master server or its IP Address).
18. If your default port is not 3306 then change it, chances are it uses the default port.
19. Click “Go.”



Slave configuration - Change or reconfigure master server

Make sure, you have unique server-id in your configuration file (my.cnf). If not, please add the following line into [mysqld] section:

```
server-id=1372932273
```

User name: replicationuser

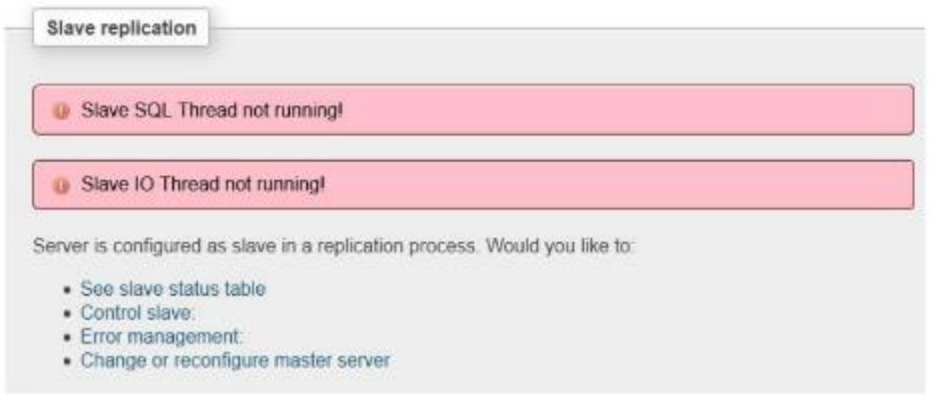
Password : ••••••

Host : spacetest

Port: 3306

Replication Step 5

20. It then takes you back to the replication screen and appears as though it’s not configured but it requires a refresh.
21. So refresh the page and you will see it’s configured but not running.



Slave replication

Slave SQL Thread not running!

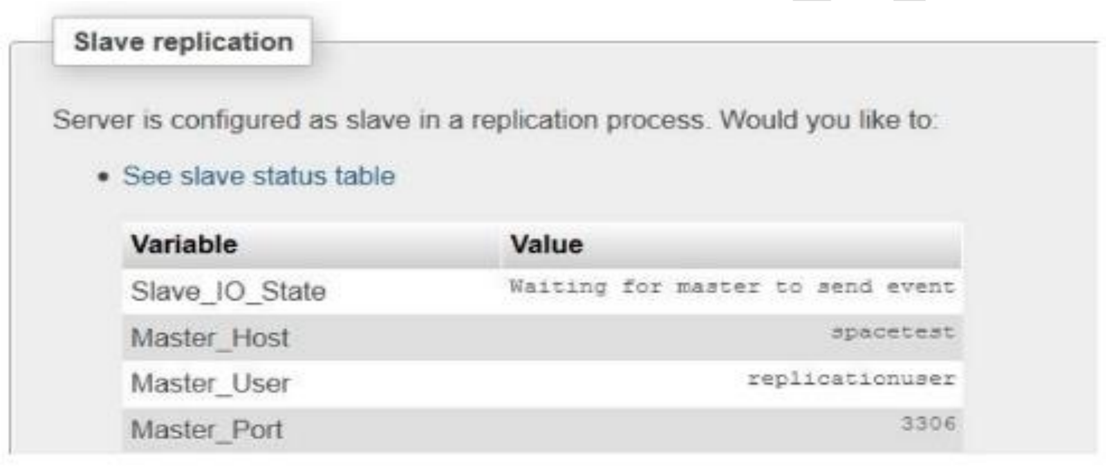
Slave IO Thread not running!

Server is configured as slave in a replication process. Would you like to:

- See slave status table
- Control slave:
- Error management:
- Change or reconfigure master server

Replication Step 6

22. Click “Control slave” then click “Full Start.”
23. PHPMyAdmin now sits there with a Loading window, after a while this will time out, if this happens or indeed after 5 minutes nothing happens then reload the replication page again (refresh it).
24. When the page reloads (either automatically or manually forced by you), you will see no error warnings and a message that says “Server is configured as slave.”
25. Now to check it’s working, click on the link that says “See slave status table.”


Slave replication

Server is configured as slave in a replication process. Would you like to:

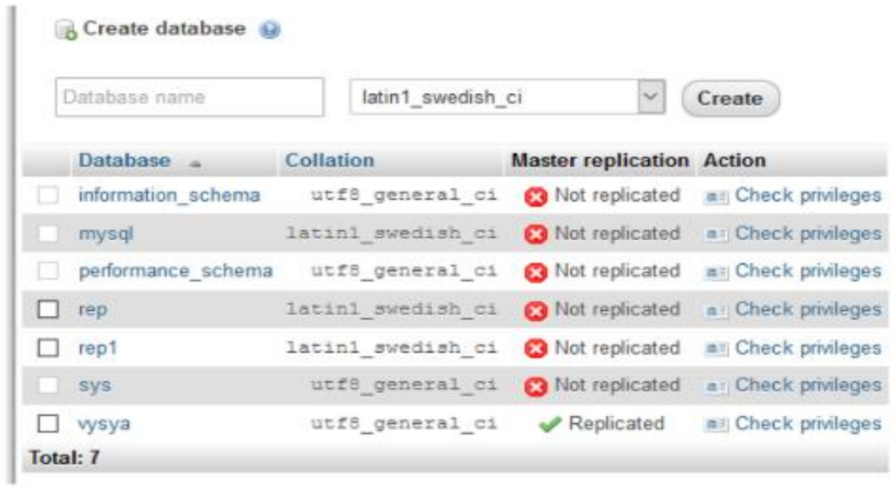
- See slave status table

Variable	Value
Slave_IO_State	Waiting for master to send event
Master_Host	spacetest
Master_User	replicationuser
Master_Port	3306

Replication Step 7

26. If everything is working then you will see a message against `Slave_IO_State` that reads “Waiting for master to send event.”

SRM



	Database	Collation	Master replication	Action
☐	information_schema	utf8_general_ci	✗ Not replicated	Check privileges
☐	mysql	latin1_swedish_ci	✗ Not replicated	Check privileges
☐	performance_schema	utf8_general_ci	✗ Not replicated	Check privileges
☐	rep	latin1_swedish_ci	✗ Not replicated	Check privileges
☐	rep1	latin1_swedish_ci	✗ Not replicated	Check privileges
☐	sys	utf8_general_ci	✗ Not replicated	Check privileges
☐	vysya	utf8_general_ci	✓ Replicated	Check privileges

Total: 7

SRM-VEC

RESULT:

Thus the above program has been successfully executed

Ex.No:04	Spatial data storage and retrieval in MYSQL

AIM:

To implement Partial data storage and retrieval in MYSQL.

PROCEDURE:

Step 1: Start the MYSQL Server.
Step 2: Create a Database.
Step 3: Create a table with spatial data type.
Step 4: Insert the spatial values in the table.
Step 5: Display the output using the select command

Step 6: In the output screen Select Form Editor output will be displayed.

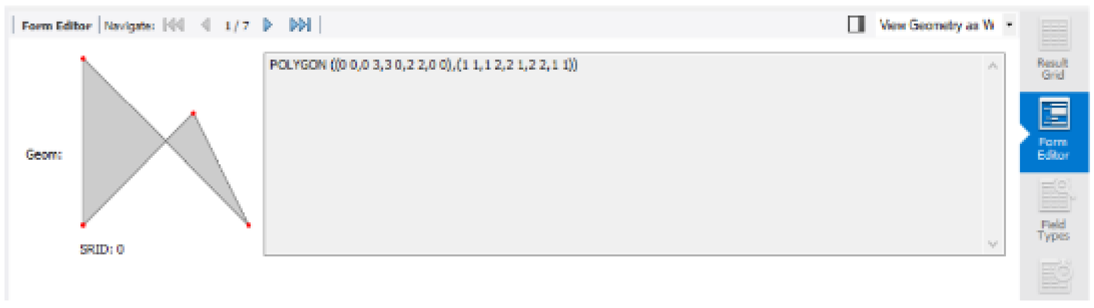
SRM

QUERIES WITH EXECUTION:

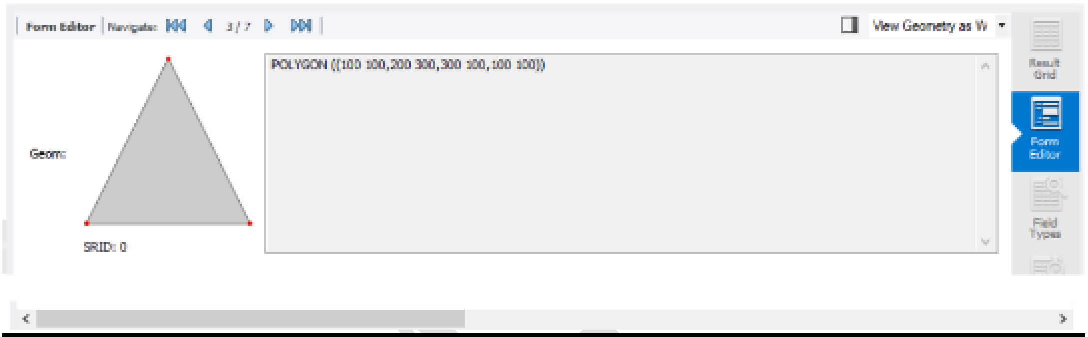
```
CREATE  TABLE  `test`  (`id`  INT NOT NULL AUTO_INCREMENT,`geom` GEOMETRY
NULL,
PRIMARY  KEY (`id`));
INSERT INTO `test`(`geom`)VALUES(st_geomfromtext
('polygon((0  0,0 3,3 0, 2 2,0 0),(1 1,1 2,2 1,2 2, 1 1))'));

select geom from test;

INSERT INTO `test`(`geom`)VALUES(st_geomfromtext
('POLYGON((100 100,200 300,300 100, 100 100))', 0));
INSERT INTO `testw`(`geom`)VALUES(st_geomfromtext
(MULTILINESTRING('LINESTRING(0  0,1 1,2 2,3 3,4 4)')));
INSERT INTO `testw`(`geom`)VALUES(st_geomfromtext
('MULTILINESTRING((12  12, 22 22), (19 19, 32 18))'));

select geom from test;
```

SRM

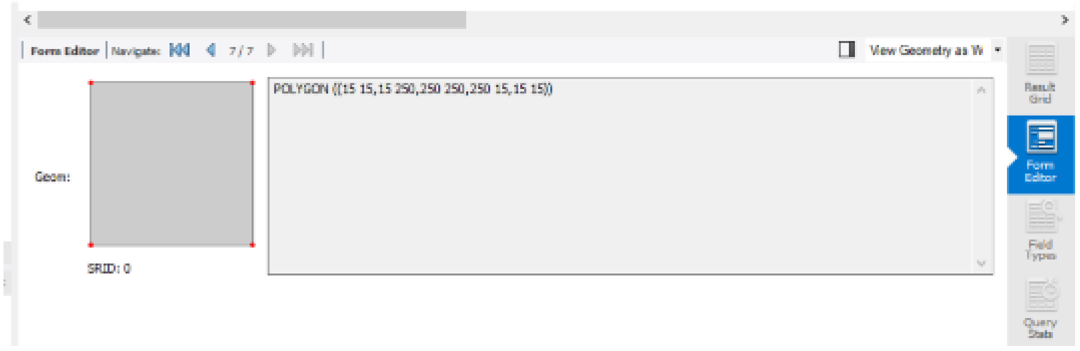
OUTPUT:



POLYGON ((0 0,0 3,3 0,2 2,0 0),(1 1,1 2,2 1,2 2,1 1))

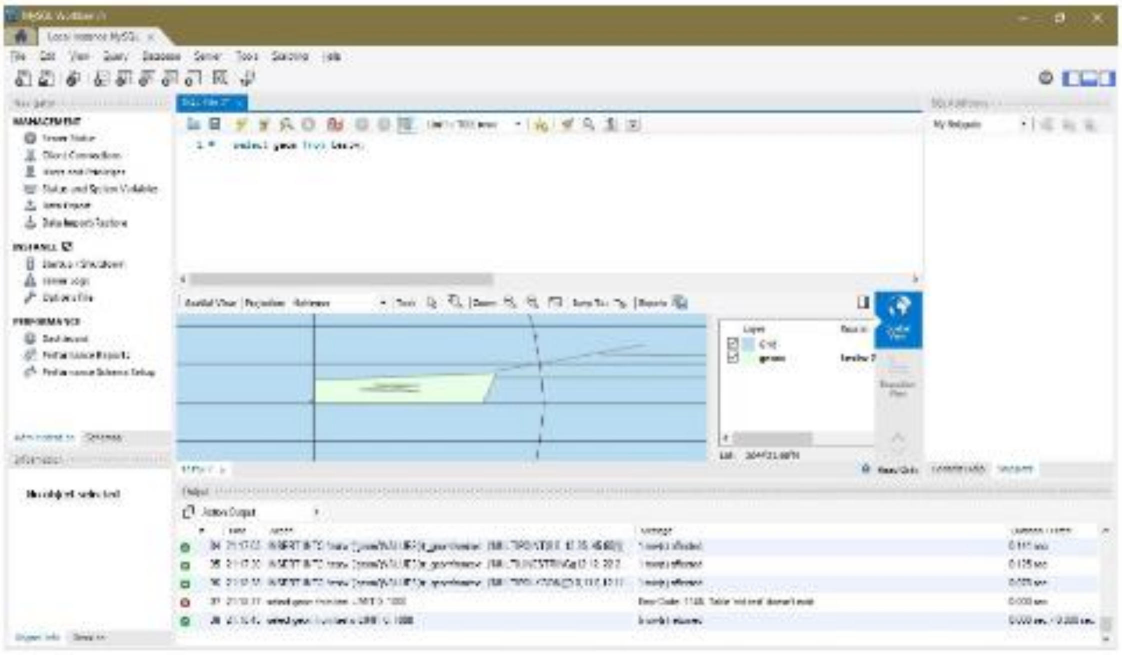


POLYGON ((100 100,200 300,300 100,100 100))



POLYGON ((15 15,15 250,250 250,250 15,15 15))

SPATIAL VIEW:



```
1 •   select geom from [illegible]
```

```
34  21:17:03  INSERT INTO [illegible] (geom) VALUES (ST_GeomFromText('POINT( [illegible] )'))       1 row(s) affected   0.11 sec
35  21:17:20  INSERT INTO [illegible] (geom) VALUES (ST_GeomFromText('LINESTRING( [illegible] )'))  1 row(s) affected   0.125 sec
36  21:17:31  INSERT INTO [illegible] (geom) VALUES (ST_GeomFromText('POLYGON(( [illegible] ))'))   1 row(s) affected   0.078 sec
37  21:18:11  select geom from [illegible] LIMIT 0, 1000     Error Code: 1146. Table [illegible] doesn't exist   0.000 sec
38  21:18:41  select geom from [illegible] LIMIT 0, 1000     3 row(s) returned   0.000 sec / 0.000 sec
```

SRM-V

RESULT:

Thus the above program for Partial data storage and retrieval in MYSQL executed successfully.

Ex.No:05	**Temporal data storage and retrieval in MYSQL**

AIM:

To Create a Temporal data storage and retrieve that data in mysql.

PROCEDURE:

Step 1: Start the MYSQL Server.
Step 2: Create a Database.
Step 3: Create Two Tables with the name of Customers and Orders.
Step 4: Insert Some record in that tables.
Step 5: Create a Temporary Table by using the object we can create it
Step 6: Show the temporary table.

SRM

QUERIES WITH EXECUTION:

```
mysql> create table customer(Cust_id  int PRIMARY KEY,cust_name  text,city
text,occupation text);
Query OK, 0 rows affected  (0.84 sec)
mysql> create table order1(order_id int PRIMARY KEY,prod_name text,price text);
Query OK, 0 rows affected  (0.89 sec)
mysql> show tables;
+-----  -+
| Tables_in_vvt  |
+-----  -+
| customer  |
| mca  |
| mcadet  |
| order1  |
+-----  -+
4 rows in set (0.10 sec)
mysql> insert into customer values(1001,'NATARAJAN S','RASIPURAM','ASST_PROF');
Query OK, 1 row affected  (0.28 sec)
mysql> insert into customer values(1002,'SUNDAR','SALEM','ASST_PROF');
Query OK, 1 row affected  (0.17 sec)
mysql> insert into customer values(1003,'SURESH','ATHUR','ASST_PROF');
Query OK, 1 row affected  (0.14 sec)
mysql> insert into customer values(1004,'UDAY','SALEM','ASST_PROF');
Query OK, 1 row affected (0.34 sec)

mysql> insert into customer values(1005,'MUNIYASAMY','AIYOTHIYA','ASST_PROF');
Query OK, 1 row affected  (0.09 sec)




mysql>  SELECT * FROM CUSTOMER;
```

```
+-----    -+  +-  -+  -+
| Cust_id  | cust_name  | city  | occupation  |
+-----    -+  +-  -+  -+
|  1001 | NATARAJAN  S | RASIPURAM | ASST_PROF  |
|  1002 | SUNDAR  | SALEM  | ASST_PROF |
|  1003 | SURESH  | ATHUR  | ASST_PROF |
|  1004 | UDAY  | SALEM  | ASST_PROF |
|  1005 | MUNIYASAMY  | AIYOTHIYA  | ASST_PROF  |
+-----    -+  +-  -+  -+
5 rows in set (0.00 sec)
mysql>  insert into order1 values(1001,'LAPTOP','1000000');
Query OK, 1 row affected (0.14 sec)

mysql>  insert  into order1 values(1002,'MOBILE','10000');
Query
OK, 1 row affected (0.12 sec)

mysql>  insert  into  order1 values(1003,'TV','15000');
Query OK, 1 row affected (0.08 sec)

mysql>  insert  into order1 values(1004,'RECHARGE','1500');
Query OK, 1 row affected (0.15 sec)
.
mysql>  insert  into order1 values(1005,'BAG','4500');
Query OK, 1 row affected (0.08 sec)
```

```
mysql> show tables;
+-----  -+
| Tables_in_vvt  |
+-----  -+
| customer  |
| mca  |
| mcadet  |
| order1  |
+-----  -+
4 rows in set (0.00 sec)

mysql> DESCRIBE customer;
+-----  -+  -+  -+  +  +  -+
| Field  | Type | Null | Key | Default  | Extra |
+-----  -+  -+  -+  +  +  -+
| Cust_id  | int  | NO  | PRI | NULL  |  |
| cust_name  | text | YES  |  | NULL  |  |
| city  | text | YES  |  | NULL  |  |
| occupation  | text | YES  |  | NULL  |  |
+-----  -+  -+  -+  +  +  -+
4 rows in set (0.00 sec)

mysql> DESCRIBE ORDER1;
+-----  +  +  +  +-  +-  +

| Field  | Type | Null | Key | Default  | Extra  |

+-----  +  +  +  +-  +-  +

| order_id  | int  | NO  | PRI | NULL  |  |

| prod_name  | text | YES  |  | NULL  |  |

| price  | text | YES  |  | NULL  |  |

+-----  +  +  +  +-  +-  +
3 rows in  set (0.04 sec)


mysql>  CREATE TEMPORARY TABLE temp_customers

->  SELECT c.cust_name,  c.city, o.prod_name, o.price

->  FROM order1 o

->  INNER JOIN customer  c ON c.cust_id  = o.order_id

->  ORDER BY o.price DESC;

Query OK, 5 rows affected (0.11 sec)

Records: 5 Duplicates:  0  Warnings:  0


mysql> show tables;

+-----  -+

| Tables_in_vvt  |

+-----  -+

| customer  |

| mca  |

| mcadet  |

| order1  |

+-----  -+

4 rows in set (0.07 sec)



mysql>  select * from temp_customers;
```

```
+-----  +-  -+  +  +

| cust_name  | city  | prod_name | price  |

+-----  +-  -+  +  +


| MUNIYASAMY  | AIYOTHIYA  | BAG  | 4500  |

| SURESH  | ATHUR  | TV  | 15000  |

| UDAY  | SALEM  | RECHARGE  | 1500  |

| NATARAJAN  S | RASIPURAM  | LAPTOP  | 1000000 |

| SUNDAR  | SALEM  | MOBILE  | 10000  |

+-----  +-  -+  +  +

5 rows in set (0.00 sec)

mysql>
```

SRM

RESULT:

Thus the above program Temporary data storage and retrieval has been executed successfully

Ex.No:06	Object storage and retrieval in MYSQL

AIM:

To implement object storage and retrieval in MYSQL using Python programming language.

PROCEDURE:

Step 1: Start the SQL Server.
Step 2: Create a Database "vysya" and Table "mca" in MYSQL
Step 2: In Python import mysql.connector to connect MYSQL with Python
Step 4:
Step 3: Create an object in python and insert that object in table
Step 4: Execute the SQL query.
Step 5: Fetch records from the result.
Step 6: Show the table after you make any changes in the table.

SRM

PROGRAM:

```
import mysql.connector

mydb = mysql.connector.connect(
   host="localhost",
   user="root",
   password="Vysya@123",
   database="vysya"
)
mycursor = mydb.cursor()
sql = "INSERT INTO mca (Name, College) VALUES (%s, %s)"
val = ("Uday", "salem")
mycursor.execute(sql, val)
mydb.commit()
print(mycursor.rowcount, "record inserted.")
mycursor.execute("SELECT * FROM mca")
myresult = mycursor.fetchall()
for x in myresult:
   print(x)
```

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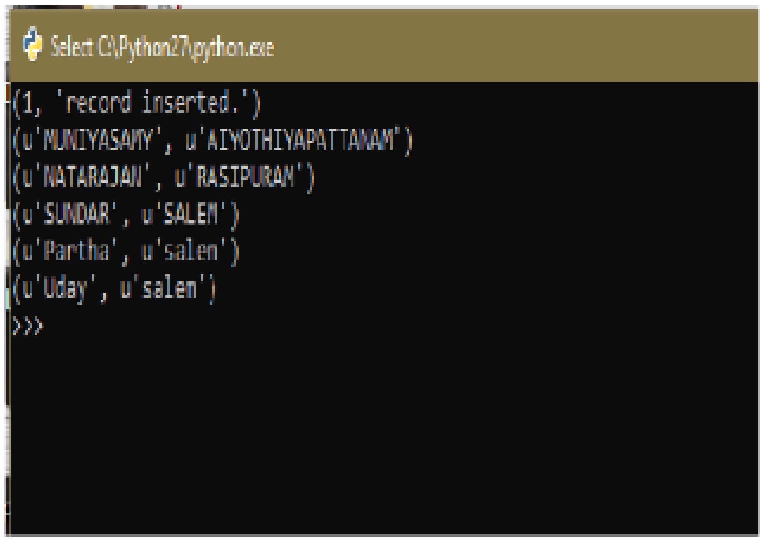
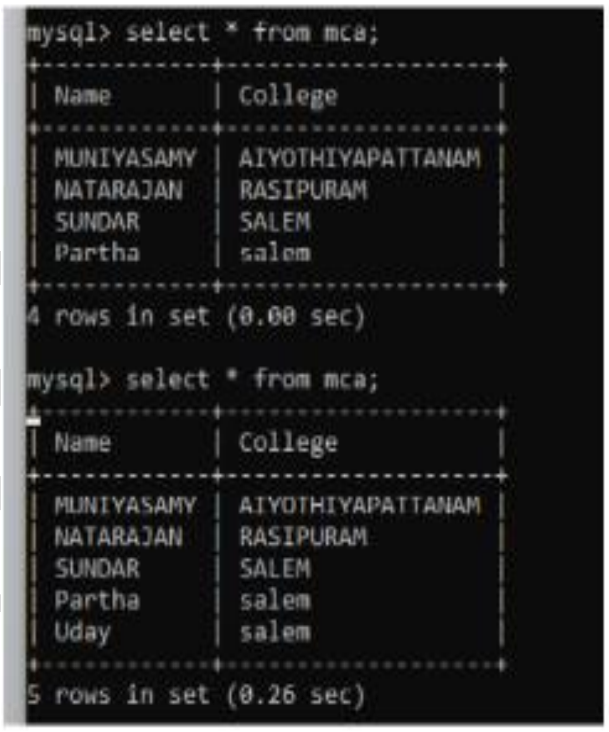
OUTPUT:



```
(1, 'record inserted.')
(u'MUNIYASAMY', u'AIYOTHIYAPATTANAM')
(u'NATARAJAN', u'RASIPURAM')
(u'SUNDAR', u'SALEM')
(u'Partha', u'salem')
(u'Uday', u'salem')
>>>
```



```
mysql> select * from mca;
+------------+-------------------+
| Name       | College           |
+------------+-------------------+
| MUNIYASAMY | AIYOTHIYAPATTANAM |
| NATARAJAN  | RASIPURAM         |
| SUNDAR     | SALEM             |
| Partha     | salem             |
+------------+-------------------+
4 rows in set (0.00 sec)

mysql> select * from mca;
+------------+-------------------+
| Name       | College           |
+------------+-------------------+
| MUNIYASAMY | AIYOTHIYAPATTANAM |
| NATARAJAN  | RASIPURAM         |
| SUNDAR     | SALEM             |
| Partha     | salem             |
| Uday       | salem             |
+------------+-------------------+
5 rows in set (0.26 sec)
```

RESULT:

Thus the program to implement object storage and retrieval in MYSQL using Python programming language has been executed successfully

Ex.No:07	XML DATABASE CREATION AND XQUERY FLWOR EXPRESSION

AIM:

To Create a XML Databases in that create a XML Table and process the XQuery FLOWR Expressions.

PROCEDURE:

Step1: Create a XML Database in Notepad and save with an Extension filename.xml.

Step2: Open Notepad.

```
<?xml version="1.0" encoding="UTF-8"?>
<Test>
<Name>Natarajan S</Name>
<Dept>Computer Science</Dept>
<College>Vysya  College</College>
<City>Salem</City>
</Test>
```

Step3: Create multiple records in a table.

Step4: Create a XML Table in that use XQuery FLWOR expression filter the record.

PROGRAM 1: (Book.xml)

```
<books>

  <book category="XML">

    <title lang="en">Learn XQuery in 24 hours</title>

    <author>Robert</author>

    <author>Peter</author>

    <college>Vysya</college>

    <year>2013</year>

    <price>50.00</price>

  </book>

  <book category="XML">

    <title lang="en">Learn XPath in 24 hours</title>

    <author>Jay Ban</author>

    <college>Vysya</college>

    <year>2010</year>

    <price>16.50</price>

  </book>

</books>
```

PROGRAM 2: (Book.xqy)

```
for $x in doc("books.xml")/books/book

where $x/price > 30

return string($x/title)
```

SRM-VEC

OUTPUT:

```
Learn .Net in 24 hours
Learn XQuery in 24 hour
```

RESULT:

Thus the above program has XML FLOWR Query has been executed successfully.

Ex.No:08	Mobile Database Query Processing using open source DB

Aim:

To write a program for Mobile Database Query Processing using open source DB using MongoDB

PROCEDURE:

Step 1: Open Eclipse and Import Java ME SDK 3.0.
Step 2: In Device Management Manually install the Java ME SDK Files.
Step 3: Open a New File JAVAME MIDLET Project, Create a project Name and configure below Emulator name.
Step 4: To establish a connection between Java ME to Mongo DB Download the Jar file Mongo DB-driver-
3.2.2. Jar and Import to Project Library
Step 5: Import the Necessary header files.
Step 6: use MONGOCLIENT to establish connection between MONGODB SERVER TO JAVA ME.
Step 7: create Collection in Mongo DB Console.
Step 8: By using find () display all the records in collections.

SRM

Program:

```
package xyz;


import com.mongodb.MongoClient;
import com.mongodb.DB;
import com.mongodb.DBCollection;
import com.mongodb.DBCursor;
import javax.microedition.midlet.MIDlet;
import javax.microedition.lcdui.Display;
import javax.microedition.lcdui.TextBox;


public class Main extends MIDlet {


    private Display display;


    public void startApp() {
        display = Display.getDisplay(this);


        // Establish connection to MongoDB
        MongoClient mongoClient = new MongoClient("localhost", 27017);
        DB db = mongoClient.getDB("test");
        DBCollection collection = db.getCollection("SSSIT");


        // Query the collection
        DBCursor cursor = collection.find();
```

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```
        StringBuilder results = new StringBuilder();

        // Display the records
        while (cursor.hasNext()) {
            results.append(cursor.next().toString()).append("\n");
        }

 // Show results on the screen
        TextBox textBox = new TextBox("MongoDB Records", results.toString(), 1024,
TextBox.NO_INPUT);
        display.setCurrent(textBox);
    }

    public void pauseApp() {
        // Not used
    }

    public void destroyApp(boolean unconditional) {
        // Clean up resources
        notifyDestroyed();
    }
}
```

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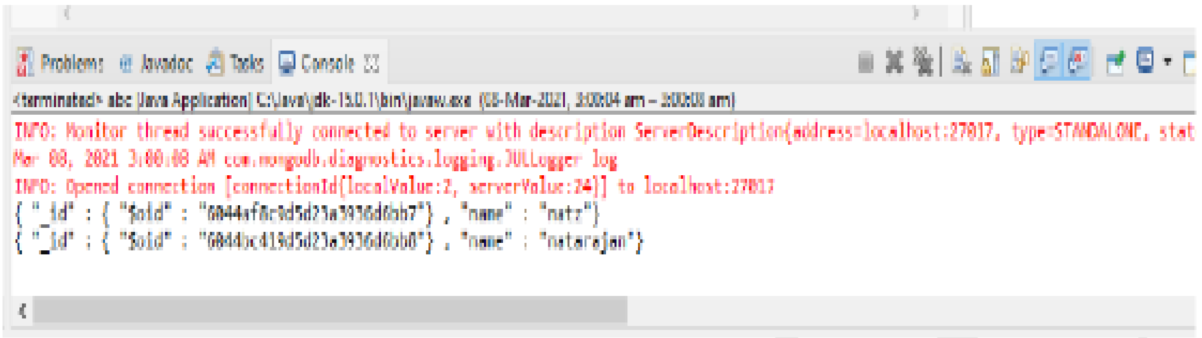
OUTPUT:



```
<terminated> abc [Java Application] C:\Java\jdk-15.0.1\bin\javaw.exe (08-Mar-2021, 3:00:04 am – 3:00:08 am)
INFO: Monitor thread successfully connected to server with description ServerDescription{address=localhost:27017, type=STANDALONE, stat
Mar 08, 2021 3:00:08 AM com.mongodb.diagnostics.logging.JULLogger log
INFO: Opened connection [connectionId{localValue:2, serverValue:24}] to localhost:27017
{ "_id" : { "$oid" : "6044af8c9d5d23a3936d6bb7"} , "name" : "natz"}
{ "_id" : { "$oid" : "6044bc419d5d23a3936d6bb8"} , "name" : "natarajan"}
```

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Result:

Thus, the above program has been successfully executed.

DBT LAB VIVA QUESTIONS

1. What is database?
2. What is DBMS?
3. What is a Database system?
4. What are the advantages of DDBMS?
5. What is the disadvantage in File Processing System?
6. Describe the three levels of data abstraction?
7. Define the "integrity rules"?
8. What is extension and intension?
9. What is System R? What are its two major subsystems?
10. How is the data structure of System R different from the relational structure?
11. What is Data Independence?
12. What is a view? How it is related to data independence?
13. What is Data Model?
14. What is E-R model?
15. What is Object Oriented model?
16. Define Replication.
17. What is an Entity type?
18. What is an Entity set?
19. What is an Extension of entity type?
20. What is Weak Entity set?
21. What is an attribute?
22. What is a Relation Schema and a Relation?
23. What is degree of a Relation?
24. What is Temporal data storage?
25. What is Relationship set?
26. What is Relationship type?
27. What is degree of Relationship type?
28. What is DDL (Data Definition Language)?
29. What is VDL (View Definition Language)?
30. What is SDL (Storage Definition Language)?
31. What is Data Storage - Definition Language?
32. What is DML (Data Manipulation Language)?
33. What is DML Compiler?
34. How Object storage and retrieval in MySQL?
35. What is DDL Interpreter?
36. What is XML Databases?
37. What is Set-at-a-time or Set-oriented?
38. What is HIVE?
39. What is Spatial DB?
40. How does Tuple-oriented relational calculus differ from domain-oriented relational calculus?
41. What is Mobile Database Query Processing?
42. What is Functional Dependency?
43. What is Lossless join property?

SRM-VEC

44. What is 1 NF (Normal Form)?
45. What is Fully Functional dependency?
46. What is 2NF?
47. What is 3NF?
48. What is BCNF (Boyce-Codd Normal Form)?
49. What is 4NF?
50. What is 5NF?
51. What is Domain-Key Normal Form?
52. What are partial, alternate,, artificial, compound and natural key?
53. What is indexing and what are the different kinds of indexing?
54. What is system catalog or catalog relation? How is better known as?
55. What is meant by query optimization?
56. What is durability in DBMS?
57. What do you mean by atomicity and aggregation?
58. What is a Phantom Deadlock?
59. What is a checkpoint and When does it occur?
60. What are the different phases of transaction?
61. What do you mean by flat file database?
62. What is "transparent DBMS"?
63. What is a query?
64. What do you mean by Correlated subquery?
65. What are the primitive operations common to all record management systems?
66. Name the buffer in which all the commands that are typed in are stored?
67. What are the unary operations in Relational Algebra?
68. Are the resulting relations of PRODUCT and JOIN operation the same?
69. What is RDBMS KERNEL?
70. Name the sub-systems of a RDBMS.
71. Which part of the RDBMS takes care of the data dictionary? How?
72. What is the job of the information stored in data-dictionary?
73. How do you communicate with an RDBMS?
74. Define SQL and state the differences between SQL and other conventional programming Languages.
75. Name the three major set of files on disk that compose a database in Oracle.
76. What is database Trigger?
77. What are stored-procedures? And what are the advantages of using them?
78. What is Storage Manager?
79. What is Buffer Manager?
80. What is Transaction Manager?
81. What is File Manager?
82. What is Authorization and Integrity manager?
83. What are stand-alone procedures?
84. What are cursors give different types of cursors?
85. What is cold backup and hot backup (in case of Oracle)?
86. What is meant by Proactive, Retroactive and Simultaneous Update.

SRM-VEC

TBS: STUDY OF PHP with MySQL

Aim To study the basic concepts of PHP with MySQL.

PHP with MySQL

Description

With PHP, you can connect to and manipulate databases.

MySQL is the most popular database system used with PHP.

MySQL is an open-source relational database management system (RDBMS). It is the most popular database system used with PHP. MySQL is developed, distributed, and supported by Oracle Corporation.

- The data in a MySQL database are stored in tables which consists of columns and rows.
- MySQL is a database system that runs on a server.
- MySQL is ideal for both small and large applications.
- MySQL is very fast, reliable, and easy to use database system.It uses standard SQL
- MySQL compiles on a number of platforms.

There are three ways of working with MySQl and PHP

1. MySQLi (object-oriented)
2. MySQLi (procedural)
3. PDO

CODE

Let's create a simple web application step by step and understand the basic building blocks of PHP with Mysql.

1. First, create an HTML document with <head> and <body> elements, as show below.

```
<html>

<body>

<?php

$dbc=mysql_connect('localhost','root',") or die(mysql_error());

mysql_select_db('bookstock') or die(mysql_error());
```

```
$bname=$_POST['booktitle'];

if($bname=="")

echo "Enter book name!";

else

{

$var=mysql_query("SELECT * FROM books  WHERE btitle='$bname'") or die(mysql_error());

$arr=mysql_fetch_array($var);

if($arr[0]!="")

{

echo "<table border size=2>";

echo"<tr><th>Accession
No.</th><th>Title</th><th>Authors</th><th>Edition</th><th>Publisher</th></tr>";

do

{

echo"<tr><td>$arr[0]<?td><td>$arr[1]</td><td>$arr[2]</td><td>$arr[3]</td><td>$arr[4]</td></tr
>";

}

while($arr=mysql_fetch_array($var));

echo "</table>";

}

else

echo "No match found";

}

mysql_close($dbc);

}

?>
```

```
<FORM ACTION="booksearch.php" METHOD="POST">
<h3>Search based on Title</h3>
Enter title :<INPUT TYPE="text" NAME="booktitle">
<INPUT TYPE="submit" value="Search">
</FORM>
</body>
</html>
```

2. Include booksearch.php file FORM section

3.RUN the application in web browser or web server;

Explanation: We can create an instance of the **mysqli** class providing all the necessary details required to establish the connection such as host, username, password etc. If the instance is created successfully then the connection is successful otherwise there is some error in establishing connection.

Result

Thus the study of PHP with MySQL was executed successfully.

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