DIVISION OF COMPUTER ENGINEERING
SCHOOL OF ENGINEERING
COCHIN UNIVERSITY OF SCIENCE
AND TECHNOLOGY
KOCHI-682022

19-202-0408 DATABASE MANAGEMENT SYSTEMS LABORATORY

LABORATORY RECORD

NAME: ABHIMANUE TD

COURSE: B-TECH COMPUTER SCIENCE AND ENGINEERING

SEMESTER: IV

REGISTER NUMBER: 20222113

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LABORATORY RECORD

Certified that the this is the Bonafide Record of the experiments done by ABHIMANUE TD Register No.20222113 of IV Semester B-Tech Computer Science and Engineering during the year 2023-2024.

Faculty in charge **Internal Evaluator** **End semester evaluator**

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CYCLE I

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CYCLE II

CYCLE-1, EXPERIMENT-1 02/04/2024

INSTALLATION AND CONFIGURATION OF MySQL SERVER AND CLIENT. NORMAL INSTALLATION, SECURE INSTALLATION, EDITING CONFIGURATION FILE

AIM

To install mysql server and client.
i) Normal installation, ii) Secure installation, iii) Edit configuration files.

PROCEDURE

i) NORMAL INSTALLATION

- Installation of MySQL client and servers from Ubuntu's packages.

```
$sudo apt install mysql-server
    $sudo apt install mysql-client
```

- After completion then start the server service.

```
$sudo systemctl restart mysql
```

- In terminal access MySQL as the root

```
$sudo mysql
```

- Now set a new password to the root account

```
>ALTER USER 'root@localhost' IDENTIFIED BY 'password';
```

ii) SECURE INSTALLATION

- To secure installation:

```
$sudo mysql_secure_installation
```

- Option for change password of root

```
$Change the password for root ?

 Press y/Y for Yes, any other key for No) : Y

$New password:            $Re-enter new password:
```

- Remove anonymous users

```
$Remove anonymous users?

  Press y for Yes, any other key for No) : N
```

- Disallow root login

```
$Disallow root login remotely?

  Press y for Yes, any other key for No) : N
```

- Remove test database

```
$Remove test database and access to it?

  Press y for Yes, any other key for No) : N
```

- Remove test database

```
$Reload privilege tables now?

  Press y for Yes, any other key for No) : Y
```

iii) EDIT CONFIGURATION FILES

- Directory /etc/mysql

```
$sudo cd /etc/mysql/
```

- Configuration of file mysql.cnf in vim

```
$vim mysql.cnf
```

RESULT

Installation of MySQL server and client with normal installation, secure installation and edit configuration files has been successful executed.

```
Databases in MySQL

>show databases
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sys                |
| abhimanue_20222113 |
+--------------------+
```

CYCLE-1, EXPERIMENT-2 02/04/2024

CREATING DATABASES, DIFFERENT TYPES OF USERS AND SETTING UP PRIVILEGES

AIM

To create different types of users,create a database and grant required privileges for the user on the database.

PROCEDURE

Types of user

```
Global user
        $sudo mysql -u root -p’password’
          >create user ’abhimanue_20222113’@’%’ identified by ’20222113’;
```

```
host specific user
        $sudo mysql -h 192.168.10.222 -u root -p’password’
          >create user ’abhimanue_20222113’@’192.168.10.222’ identified by ’20222113’;
```

Creating Database

```
        >create database ’abhimanue_20222113’;
```

Granting privilleges

```
        >grant all privileges on ’abhimanue_20222113’.* to
          ’abhimanue_20222113’@’192.168.10.222’;
              >flush privileges;
```

RESULT

Creation of normal and host users,a database and their privileges has been executed.

```
Table for student_list
+----------+--------------+------+-----+---------+----------------+
| Field    | Type         | Null | Key | Default | Extra          |
+----------+--------------+------+-----+---------+----------------+
| S_id     | int          | NO   | PRI | NULL    | auto_increment |
| Regno    | int          | YES  |     | 0       |                |
| Name     | varchar(50)  | YES  |     | NULL    |                |
| Semester | varchar(3)   | YES  |     | NULL    |                |
| Course   | varchar(100) | YES  |     | NULL    |                |
| Adm_Year | varchar(4)   | YES  |     | NULL    |                |
| DOB      | datetime     | YES  |     | NULL    |                |
| Address  | varchar(200) | YES  |     | NULL    |                |
| District | varchar(50)  | YES  |     | NULL    |                |
| State    | varchar(50)  | YES  |     | NULL    |                |
| Country  | varchar(50)  | YES  |     | NULL    |                |
| Pincode  | int          | YES  |     | NULL    |                |
+----------+--------------+------+-----+---------+----------------+
```

CYCLE-1, EXPERIMENT-3 02/04/2024

CREATING TABLES, INSERTING AND UPDATING VALUES

AIM

To create tables for student list, courses and department with the provided fields and update their values

QUERIES

Accessing database

```
$sudo mysql -h 192.168.10.222 -u 'abhimanue_20222113' -p'20222113';
  >use 'abhimanue_20222113'
```

Creating tables

`-Student List`

```
    >create table students_list(S_id int not null auto_increment primary key, regno int
    default'0', Name varchar(50),semester varchar(3),course varchar(100)
    ,adm_year varchar(4),Dob datetime,address varchar(50),country varchar(50),pincode int);

      >desc table students_list;
```

```
Table for Courses
+-------------+-------------+------+-----+---------+----------------+
| Field       | Type        | Null | Key | Default | Extra          |
+-------------+-------------+------+-----+---------+----------------+
| C_id        | int         | NO   | PRI | NULL    | auto_increment |
| Course_Code | varchar(10) | YES  |     | NULL    |                |
| Department  | varchar(10) | YES  |     | NULL    |                |
| Course_Name | varchar(50) | YES  |     | NULL    |                |
+-------------+-------------+------+-----+---------+----------------+
```

```
Table for Departments
+---------+--------------+------+-----+---------+----------------+
| Field   | Type         | Null | Key | Default | Extra          |
+---------+--------------+------+-----+---------+----------------+
| D_id    | int          | NO   | PRI | NULL    | auto_increment |
| Depcode | varchar(10)  | YES  |     | NULL    |                |
| Dname   | varchar(100) | YES  |     | NULL    |                |
+---------+--------------+------+-----+---------+----------------+
```

`-Courses Table`

>create table courses(C_id int not null auto_increment primary key,course_code varchar(10),

Department varchar(10), course_name varchar(50));

>desc table courses;

`-Departments Table`

>create table Departments(D_id int not null auto_increment primary key,

Depcode varchar(10),

>desc table Department;

```
inserted into Students_list
+------+----------+----------+----------+--------+----------+---------------------+----------+-----------+--------+---------+---------+
| S_id | Regno    | Name     | Semester | Course | Adm_Year | DOB                 | Address  | District  | State  | Country | Pincode |
+------+----------+----------+----------+--------+----------+---------------------+----------+-----------+--------+---------+---------+
|    1 | 20222113 | Abhimanue| S4       | CS     | 2021     | 2004-11-10 00:00:00 | Pipeline | Ernakulam | Kerala | India   |  682024 |
|    2 | 20222114 | Athul    | S5       | CS     | 2020     | 2001-06-04 00:00:00 |Padivattom| Ernakulam | Kerala | India   |  682025 |
|    3 | 20223456 | Bidul    | S3       | CE     | 2022     | 2005-01-12 00:00:00 | Jantha   | Ernakulam | Kerala | India   |  682025 |
|    4 | 20221009 | Vyshak   | S6       | IT     | 2020     | 2000-05-02 00:00:00 | Fort     | Ernakulam | Kerala | India   |  683534 |
|    5 | 20222001 | Subi     | S4       | CS     | 2021     | 2004-04-06 00:00:00 | Kaloor   | Ernakulam | Kerala | India   |  682028 |
+------+----------+----------+----------+--------+----------+---------------------+----------+-----------+--------+---------+---------+

inserted into Courses
+-----+------------+--------------------------+------------+
| cid | coursecode | coursename               | department |
+-----+------------+--------------------------+------------+
|   1 | CS         | Computer science         | CSE        |
|   2 | MD         | Machine Drawing          | ME         |
|   3 | S          | Survey                   | CE         |
+-----+------------+--------------------------+------------+

inserted into Departments
+-----+---------+-----------------------------------------------------------------------------------+
| did | depcode | dname                                                                             |
+-----+---------+-----------------------------------------------------------------------------------+
|  1  | SOE     | School of Engineering                                                             |
|  2  | DOI     | Department of Instrumentation                                                     |
+-----+---------+-----------------------------------------------------------------------------------+
```

Inserting values into table

-Courses

```
>insert into courses(Course_code,Course_Name, Department) values
 ('CS','Computer Science','CSE'),('MD','Machine Drawing','ME'),
('S','Survey','CE');
>select * from courses;
```

-Department

```
>insert into departments(Depcode,Depname) values('SOE','School of
 Engineering'),('DOI','Department of Instrumentation');
>select * from department;
```

-Student_list

```
>insert into students_list(Regno,Name,Semester,Courses,Adm_Year,
 DOB,Address,District,State,Country,Pincode)
 values(20222113,'Abhimanue','S4','CS','2021','2004-11-10',
 'Pipeline','Ernakulam','Kerala','India',682024),(20222114,'Athul',
'S5','CS','2020','2001-06-04','Padivattom','Ernakulam'
,'Kerala','India',682025),(20223456,'Bidul','S3','CE','2022','2005-01-
12','Janatha','Ernakulam','Kerala','India',682025),(20221009
,'Vyshak','S4','IT','2020','2000-05-02','Fort','Ernakulam','Kerala',
'India',683534),(20222001,'Subi','S4','CS','2021',
'2004-04-06','Kaloor','Ernakulam','Kerala'
,'India',682028);
>select * from students_list;
```

RESULT

Table for student_list,course and department with values has been successfully executed.

```
All science department of Department table to sciencedpt
+--------+---------+------------------------------------------------------+
| deptid | depcode | depname                                              |
+--------+---------+------------------------------------------------------+
|     1  | ES      | Earth Science                                        |
|     2  | SS      | Space Science                                        |
|     3  | PS      | Physical science                                     |
|     4  | CS      | Computer Science                                     |
+--------+---------+------------------------------------------------------+

Append "(sciences)" to dept_name of sciencedpt
+-------+----------+-------------------------------------------------------+
| depid | deptcode | dept_name                                             |
+-------+----------+-------------------------------------------------------+
|     1  | ES      | Earth Science(sciences)                               |
|     2  | SS      | Space Science(sciences)                               |
|     3  | PS      | Physical science(sciences)                            |
|     4  | CS      | Computer Science(sciences)                            |
+-------+----------+-------------------------------------------------------+
```

INSERTING AND UPDATING VALUES FROM OTHER TABLES AND .csv FILES

AIM

To insert and update values from another table and to import tables from a comma separated file.

QUERIES

All values of Department table will be inserted into sciencedpt which has ”science” word in it.

```
>insert into table sciencedpt(deptid,depcode,

  depname) select depid,deptcode, dept_name

  from departments where dept_name like %science%;
```

Append ”(sciences)” to value of dept_name when department.deptcode=sciencedept.depcode

```
>UPDATE departments JOIN sciencedpt ON sciencedpt.depcode =

  departments.deptcode SET departments.dept_name = concat

  (sciencedpt.depname,"(sciences)");
```

```
>desc course;
+------------+------+------+-----+---------+----------------+
| Field      | Type | Null | Key | Default | Extra          |
+------------+------+------+-----+---------+----------------+
| cid        | int  | NO   | PRI | NULL    | auto_increment |
| coursecode | text | YES  |     | NULL    |                |
| coursename | text | YES  |     | NULL    |                |
| department | text | YES  |     | NULL    |                |
+------------+------+------+-----+---------+----------------+
```

```
test.csv
+-------------------------------------------+
|cid,coursecode,coursename,department       |
|1,"CP","c programming","CSE"               |
|2,"DE","Digital Electronics","ECE"         |
|3,"DBMS","Database Management System","CSE"|
+-------------------------------------------+
```

```
>select * from course;
+-----+------------+--------------------------+------------+
| cid | coursecode | coursename               | department |
+-----+------------+--------------------------+------------+
|   1 | CP         | c programming            | CSE        |
|   2 | DE         | Digital Electronics      | ECE        |
|   3 | DBMS       |Database Management System| CSE        |
+-----+------------+--------------------------+------------+
```

Directory file location for .csv file

```
/var/lib/mysql-files/
```

Move .csv file to that directory.

```
$ sudo mv test.csv/var/lib/mysql-files/
```

Adding the .csv file to MySQL

```
>mysql load data local infile ’test.csv’
    into table course
    fields terminated by ’,’
    enclosed by ’"’
    lines terminated by ’\n’
    ignore 1 rows;
```

RESULT

Familiarised with importing .csv files, insertion and updation of data based of another table has been successfully executed.

```
Students in 'CS'
+----------+----------+------------------+-------------+
| Regno    | Name     | Course_Name      | Course_Code |
+----------+----------+------------------+-------------+
| 20222114 | Athul    | Computer Science | CS          |
| 20222118 | Arun     | Computer Science | CS          |
+----------+----------+------------------+-------------+


Student not in lab.
+----------+----------+------------------+-------------+
| Regno    | Name     | Course_Name      | Course_Code |
+----------+----------+------------------+-------------+
| 20223543 | Rahul    | Computer Science | CS          |
+----------+----------+------------------+-------------+
```

CYCLE-1, EXPERIMENT-5 02/04/2024

SELECT QUERIES

AIM

To use select queries to retrieve information from the database based on the conditions I impose.

QUERIES

`Students with course=’CS’`

```
>select Regno,Name,Course_Name,Course_Code from Students_list,Courses where
   Courses.Coursecode=’CS’ and Students_list.Courses=Courses.Course_code;
```

`Students not in lab.`

```
>select * from Students_list where Regno not in(select Regno from student_lab);
```

RESULT

Select queries to retrieve information from the database based on the condition has been successfully executed.

Course inner join department.

```
+-----+------------+--------------------------+------------+-----+---------+---------------------------------+
| cid | coursecode | coursename               | department | did | depcode | dname                           |
+-----+------------+--------------------------+------------+-----+---------+---------------------------------+
|   1 | MD         | Machine Drawing          | ME         |   1 | ME      | Mechanical Engineering          |
|   2 | DE         | Digital Electronics      | EE         |   2 | EE      | Electronics And Engineering     |
|   3 | DBMS       |Database Management System| CSE        |   3 | CE      | Computer Science Engineering    |
+-----+------------+--------------------------+------------+-----+---------+---------------------------------+
```

JOIN TABLES

AIM

To familiarize with the various join queries in MySQL.

QUERIES

Joins in MySQL.

`Inner join`

It returns all the matched rows from both the tables.

`Left join`

It returns all the records from the first table and matched records from the second one

`Right join`

It returns all the record from the second table and matched records from the first table to perform a left join

```
>select * from course inner join department on
  course.department=department.depcode;
```

`Cross join`

It returns all combinations of records from both the tables. it require no conditions. to perform a cross join select * from course cross join department;

RESULT

Familiarised various types of joins in MySQL and executed successfully.

NORMALIZING TABLES

AIM

To study about the standard normalization procedures for a table.

PROCEDURES

Normalization

Normalization is the process of minimizing redundancy from a relation or set of relations. Redundancy in relation may cause insertion, deletion, and update anomalies. So, it helps to minimize the redundancy in relations. Normal forms are used to eliminate or reduce redundancy in database tables.

First normal form (1NF)

This is the most basic level of normalization. In 1NF, each table cell should contain only a single value, and each column should have a unique name. The first normal form helps to eliminate duplicate data and simplify queries.

Second normal form (2NF)

2NF eliminates redundant data by requiring that each non-key attribute be dependent on the primary key. This means that each column should be directly related to the primary key, and not to other columns.

Third normal form (3NF)

3NF builds on 2NF by requiring that all non-key attributes are independent of each other. This means that each column should be directly related to the primary key, and not to any other columns in the same table.

RESULT

Familiarised various normalization procedures of a relation.

CYCLE-1, EXPERIMENT-8 02/04/2024

DUMP, IMPORT AND SOURCE IN MYSQL

AIM

To export databases to an .sql file and to restore an sql file into a database

QUERIES

Dump an entire database

```
$mysqldump -u ’abhimanue_20222113’ -p ’20222113’ test >dump.sql
```

Dump specific tables

```
$mysqldump -u ’abhimanue_20222113’ -p ’20222113’ test t1 t3 t7 >dump.sql
```

Import sql file to MySQL

```
$mysqlimport -u ’abhimanue_20222113’ -p ’20222113’ test <file.sql
```

source

It is also used for import sql file when the user is already in a mysql prompt and if the file is comparitively large.

```
>source /path/file.sql;
```

RESULT

Familiarised MySQL dump, import and source commands with queries.

CYCLE-2, EXPERIMENT-1 11/06/24

INSTALLING NGINX AND PHP

AIM

To install nginx, php, and php-fpm

PROCEDURE

Installing nginx

●To install nginx

```
    $sudo apt update
    $sudo apt install -y nginx
    $nginx -v (To check version)
```

Installing php,php-fpm

●To install php and php fpm

```
    $sudo apt update
    $sudo apt install php php-fpm
    $php -v (To check version)
```

RESULT

Installation of nginx, php and php-fpm has been successfully installed.

CONFIGURING NGINX AND PHP

AIM

To configure nginx, php, and php-fpm

PROCEDURE

Configuring nginx

•Read the nginx configuration file and create file with extension .conf

```
$sudo cp /etc/nginx/sites-enabled/default /etc/nginx/conf.d/cs.conf
```

•To edit the config file

```
$sudo vim /etc/nginx/conf.d/default.conf
```

•Uncomment only the virtual host block and change version of php
give a suitable domain name like dbms.cs/
select a suitable root folder like /var/www/html (default)
•Change the ownership of the root folder to create and edit file without root permissions.

```
$sudo chown -R 20222113 /var/www/html
```

•Sample html page

```
    $vim /var/www/html/Test
<!DOCTYPE >
<HTML><body>
<h1 >Test </h1 >
</body ></HTML >
```

•Edit the hosts file and add the domain to it

```
$sudo vim /etc/hosts

 127.0.0.1 dbms.cs
```

•Check nginx configuartion.

```
$sudo nginx -t
```

•Save and exit. Restart nginx.

```
$sudo systemctl restart nginx
```

•In web browser to verify the page which says ”Test”

```
http://dbms.cs/Test
```

Configuring php,php-fpm

•Edit the nginx conf file to include php

```
$sudo nano /etc/nginx/conf.d/cs.conf
```

•Add index.php to the indexing line

•Copy the php block from the default configuration file from /etc/nginx/sites-avialble/default to /etc/nginx/conf.d/cs.conf

•Comment the line that goes fastcgi_pass unix:/var/run/php/php7.2-fpm.sock;

•To check whether the configuration is correct create a php file in the root folder.

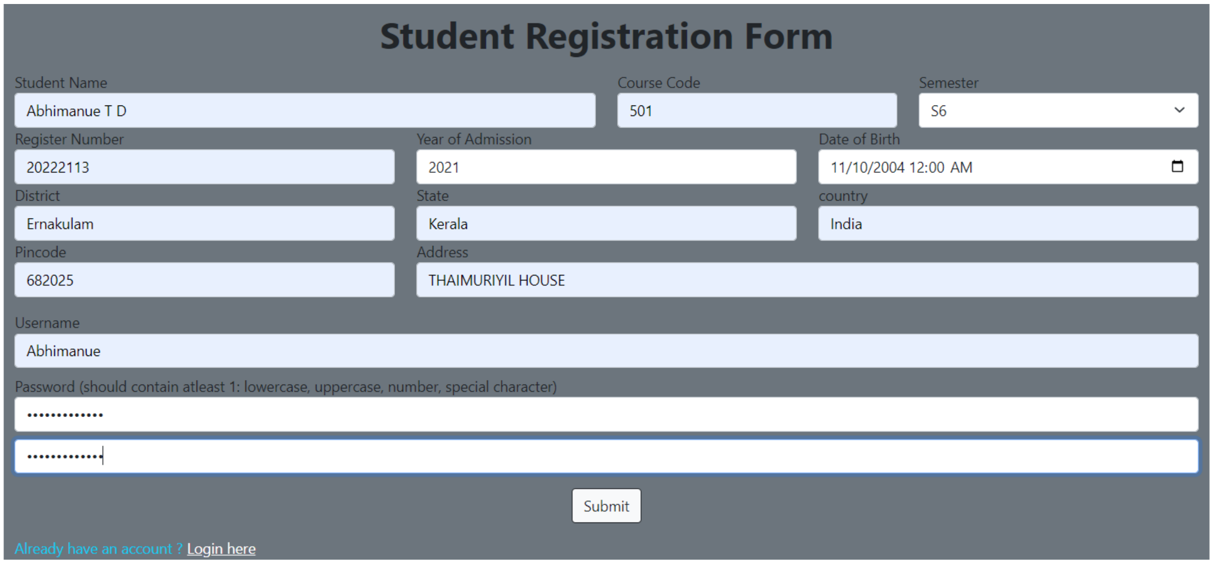
```
$vim /var/www/html/test.php
<?php
phpinfo();
?>
```

•Reload nginx open a web browser.

```
http://dbms/test.php
```

RESULT

Configuration of nginx, php and php-fpm has been successfully implemented.



Student Registration Form

Student Name: Abhimanue T D	Course Code: 501	Semester: S6
Register Number: 20222113	Year of Admission: 2021	Date of Birth: 11/10/2004 12:00 AM
District: Ernakulam	State: Kerala	country: India
Pincode: 682025	Address: THAIMURIYIL HOUSE	

Username: Abhimanue

Password (should contain atleast 1: lowercase, uppercase, number, special character)

•••••••••••••

•••••••••••••

Figure 1: Student Registration Form

CREATE A WEBPAGE FOR STUDENTS REGISTRATION WITH ALL THE FIELDS LR REQUIRED AS PER THE EXPERIMENT IN CYCLE NUMBER 1 FOR STUDENT DATA AND ALSO INCLUDE USERNAME AND PASSWORD IN REGISTRATION FORM AND ALSO HASH THE PASSWORD

AIM

To create a webpage for student registration with all the fields that are required as per the experiment in cycle 1 for student database by creating a form, including user and password fields in the registration form and to encrypt the password with sha512.

PROCEDURE

Creating tables in database

```
$ mysql -u abhimanue_20222113 -h 192.168.10.222 -p
  >use abhimanue_20222113;
```

Table for authentication

```
>create table auth(sid int primary key,username varchar(30) unique,password varchar(128),foreign key(sid) references to studentslist(sid));
```

Table for student list

```
>create table studentlist(sid int Primary Key,name varchar(30),address text,year year,country varchar(30),course int,district varchar(30),dob date,pincode int,regno int,sem varchar(3),state varchar(30));
```

HTML file in the nginx root folder

$ nano /home/20222113/newreg.html
In HTML add required headers for bootstrap and link php file using form action reg.php. Form in POST method inside form required fields for student details and submit button.
For Bootstrap.

```
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/
    bootstrap/3.3.7/css/bootstrap.css">
    <style type="text/css">
```

And password can be hash using hash('sha512',$password).

Create php file to use database

$ vim /home/20222113/newreg.php
Values passed by html will be transfer to database by connecting database.

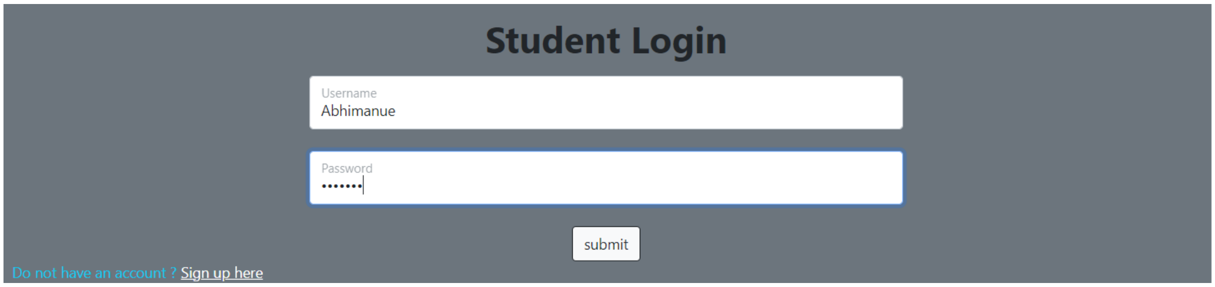
```
$con = new mysqli("localhost","20222113","20222113", "abhimanue_20222113"
        , 3306, "") or die ('Could not connect to the database server' .
            mysqli_connect_error());

    $loginqr = "INSERT INTO studentslist (regno, name, semester, course,
    adm_year,dob, address, district, state, country, pincode) VALUES ("
    . $regno . ", \"" .$name . "\", \"" . $semester . "\", \"" . $course
    . "\", " . $adm_year . ", \"" . $dob . "\", \"" . $address . "\",
    \"" . $district . "\", \"" . $state . "\", \"" . $country . "\", "
    . $pincode . ");";

    $statement = $con->prepare($loginqr);
```

RESULT

Registration form for students with hash function has been successfully implemented.



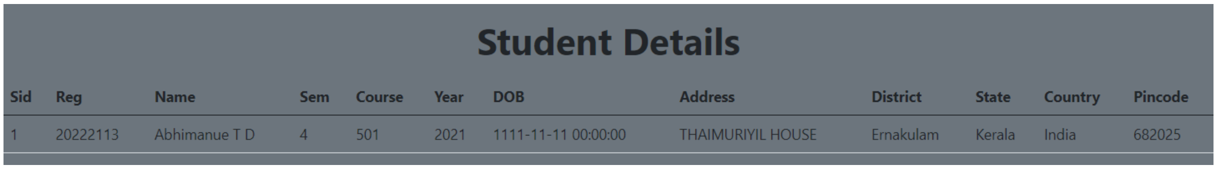
Student Login

Username
Abhimanue

Password
•••••••

Do not have an account ? Sign up here

Figure 2: Student Login



Student Details

Sid	Reg	Name	Sem	Course	Year	DOB	Address	District	State	Country	Pincode
1	20222113	Abhimanue T D	4	501	2021	1111-11-11 00:00:00	THAIMURIYIL HOUSE	Ernakulam	Kerala	India	682025

Figure 3: Student Details

CREATE A LOGIN PAGE THAT ACCEPTS THE USERNAME AND PASSWORD FOR STUDENT DATA.IF SUCCESSFULL LOGIN AND SHOW DETAILS

AIM

To create a login page for user and password for student data which displays student details on successfull login.

PROCEDURE

•Create an html file in the nginx root folder which has required field for 'username' and 'password'.

```
$ vim /home/20222113/login.html
```

•Creat a php in the nginx root folder

```
$ vim /home/20222113/login.php
```

•Check if username and password is correct in table 'auth':

```
$doquerry=mysqli_query($con,$query);
while ($row=mysqli_fetch_array($doquerry)) {
if(hash('sha512',$password)==$row['password']){
```

•Check if details are available in studentslist table:

```
while ($row2=mysqli_fetch_array($doquerry2)) {
if($row['sid']==$row2['sid'])
```

•Then print all values in that row in table.

RESULT

Login page for students using php has been successfully implemented.