UE21CS351A: Database Management System

MINI PROJECT USER REQUIREMENT SPECIFICATION

- **PES1UG21CS429, Pranav Bookanakere**
- **PES1UG21CS430, Pranav G Kashyap**

Software Requirements Specification (SRS) - Project Description

1. Project Overview

The "Indian Education System Database Management System" is a software project designed to model and manage various aspects of the Indian education system. The primary objective of this system is to provide a comprehensive platform for handling student information, examination details, tuition classes, college admissions, universities, courses, results, and research publications. The system aims to streamline education-related processes and enhance data management in the context of the Indian education system.

2. Major Project Functionalities

2.1. Student Management

- **Description:** The system will allow the management of student records, including personal details, academic history, and examination enrollments.
- **Functionalities:**
  - Insert, update, delete, and display student information.
  - Associate students with different examinations.
  - Track student enrollment in tuition classes.

2.2. Examination Management

- **Description:** This feature enables the creation and management of various examinations conducted in India.
- **Functionalities:**
  - Define new examinations, including exam names and dates.
  - Link students to specific examinations.

2.3. Tuitions Management

- **Description:** Users can manage tuition classes available for student enrollment.
- **Functionalities:**
  - Add, modify, or delete tuition class information.
  - Specify course details, schedules, and instructors.

2.4. College Admissions

- **Description:** This feature focuses on handling college admissions after a student's 12th-grade education.
- **Functionalities:**
    - Maintain a list of colleges.
    - Define admission criteria and requirements.
    - Process and record student admissions based on their 12th-grade results.

2.5. University Management

- **Description:** The system will provide information about universities offering higher education, including engineering and medical colleges.
- **Functionalities:**
    - Manage details of universities, colleges, and affiliated institutions.

2.6. Course Management

- **Description:** Users can access and manage courses offered by different universities.
- **Functionalities:**
    - View course descriptions, prerequisites, and associated universities.

2.7. Result Management

- **Description:** This feature allows the capture and display of student examination results.
- **Functionalities:**
    - Record and update student examination results.
    - Enable result queries based on student and examination information.

2.8. Publication Management

- **Description:** The system will maintain records of research publications for students affiliated with specific universities.
- **Functionalities:**
    - Record research publications and associated student details.

3. System Features and Function Requirements

1. Insert, Delete, Update, and Display Operations for Each Entity:

- For each entity (Student, Examination, Tuitions, College, University, Courses, Result, Publication), create forms or interfaces in the system to perform insert, delete, update, and display operations.

2. Trigger Appropriate to the Problem Statement:

- Example Trigger: Implement a trigger that automatically updates the student's overall performance status (e.g., Pass/Fail) based on the results of individual examinations

when a new result is inserted into the system. The trigger should update the student's status accordingly.

3. Procedure Appropriate to the Problem Statement:

- Example Procedure: Create a stored procedure that generates a report showing the top-performing students in a specific examination. The procedure takes the examination ID as input and returns a list of students who achieved the highest scores.

4. Function Appropriate to the Problem Statement:

- Example Function: Develop a user-defined function that calculates the GPA (Grade Point Average) of a student based on their examination results. The function takes a student ID as input and returns the GPA.

5. Three Simple Queries:

a. Retrieve a list of all students enrolled in a specific course. b. Find the total number of students enrolled in tuition classes. c. Display the details of a particular college, including its admission criteria.

6. Two Nested Queries:

a. Find all students who scored above the average in a specific examination, and for each student, list the examinations they are enrolled in. b. Retrieve a list of courses offered by universities, where each course includes the number of students enrolled in it.

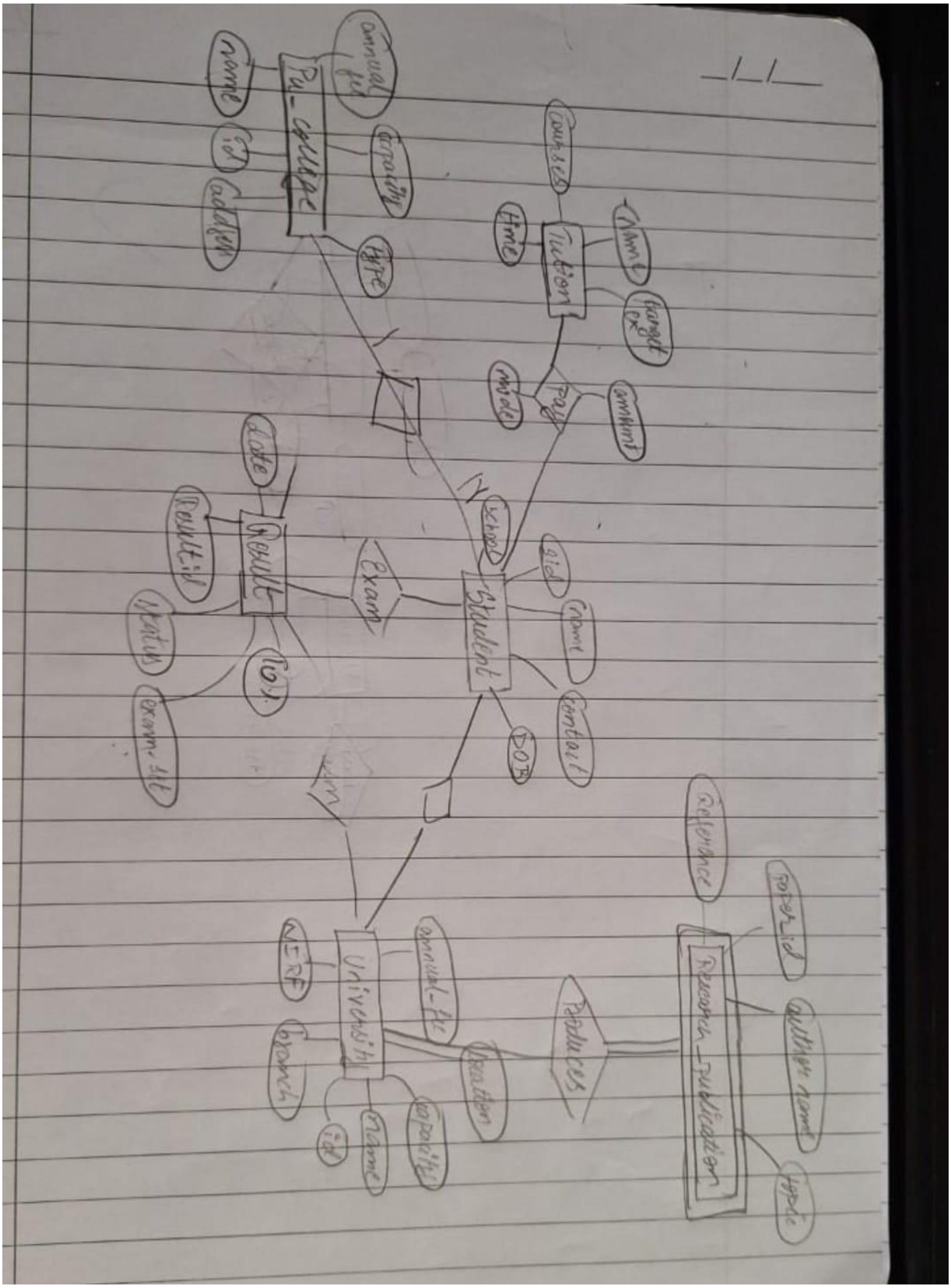
7. Two Correlated Queries:

a. Calculate the average score of each student across all examinations, and then find the students who scored below this average in at least one examination. b. List the students who published research publications for a specific university, along with the count of publications for each student.

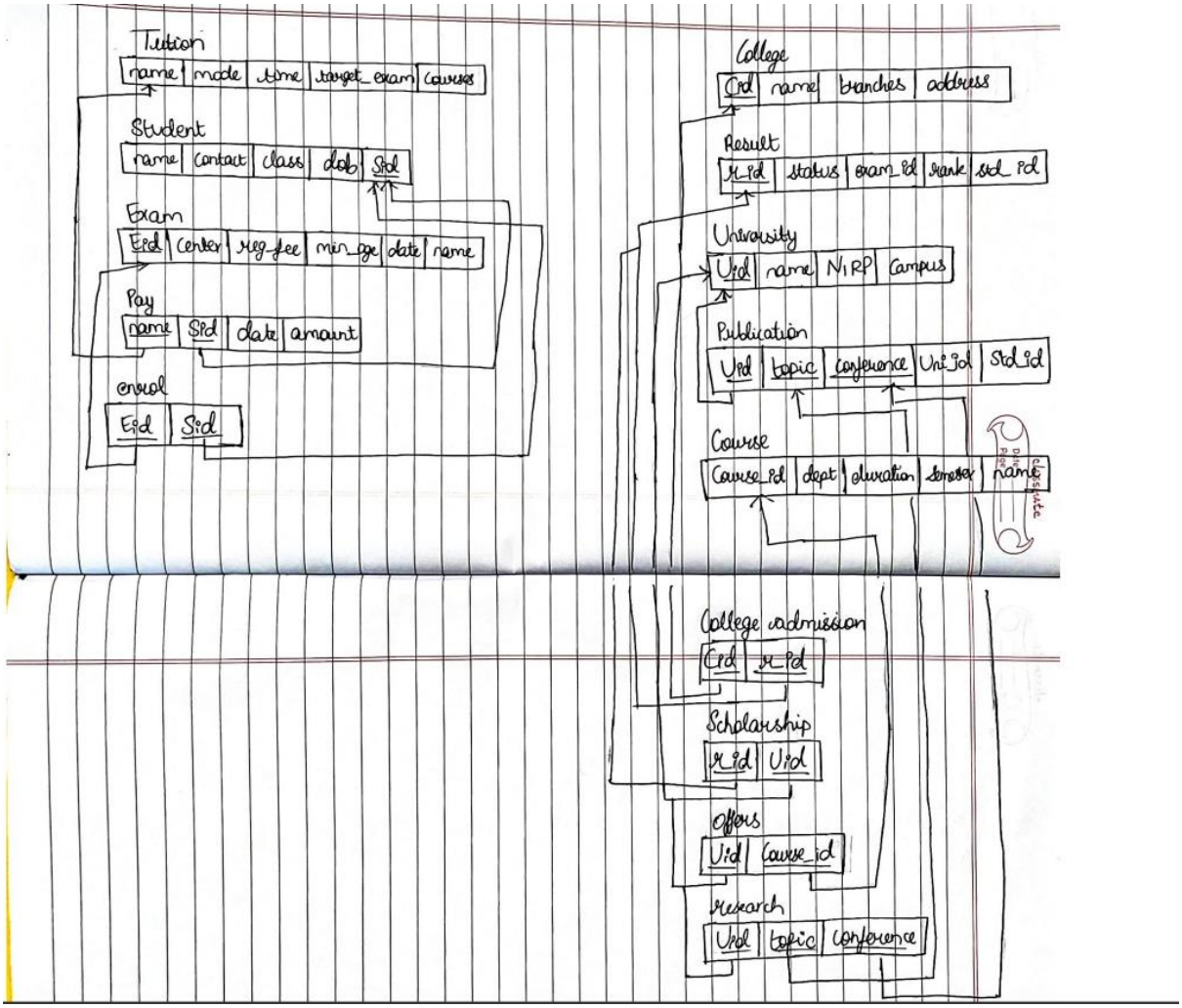
8. Two Aggregate Queries Using GROUP BY/HAVING Clause:

a. Determine the number of students enrolled in each course, and filter the courses to only include those with more than 50 students. b. Calculate the average score in each examination, group the results by examination, and display only those examinations where the average score is above 70.

ER Diagram –



Relational Schema –



Trigger –

```
DELIMITER $$


CREATE TRIGGER decrement_college_capacity

BEFORE INSERT ON pu_admission

FOR EACH ROW

BEGIN

    DECLARE college_capacity INT;
```

```
    -- Retrieve the capacity of the college
    SELECT capacity INTO college_capacity
    FROM pu_college
    WHERE college_id = NEW.college_id;

    -- Check if the capacity allows a new admission
    IF college_capacity > 0 THEN
        -- Decrement the capacity by 1
        UPDATE pu_college
        SET capacity = capacity - 1
        WHERE college_id = NEW.college_id;
    ELSE
        -- Prevent the admission if capacity is already full
        SIGNAL SQLSTATE '45000'
        SET MESSAGE_TEXT = 'Capacity Full: Cannot admit more students.';
    END IF;
END $$
DELIMITER ;
```

- This is a trigger to decrease the capacity of the college by 1 when a new admission is made to the college.

```
INSERT INTO PU_admission (student_id, college_id, admission_date) VALUES
(3,1,CURDATE());
```

Before admission – The capacity of RV PU College was 59.

```
mysql> select * from pu_college;
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
| college_id | name               | address            | type    | annual_fee | capacity | contact_email | contact_phone | college_description |
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
|          1 | RV PU College      | Jayanagar 3rd block | Science |  100000.00 |       59 | rvpu@edu      | 123456789     | IIT JEE Batch       |
|          2 | Jain college       | RR Nagar           | Science |   80000.00 |      120 | jain@edu      | 12927652956   | jee integrated      |
|          4 | Christ PU College  | Koramangla         | Science |  120000.00 |       78 | christ@edu    | 268729        | Science college     |
|          6 | Brigade PU College | JP Nagar           | Science |  100000.00 |      120 | brigade@edu   | 9384739       | PU College          |
|
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
4 rows in set (0.00 sec)
```

After admission – The capacity of RV PU College is reduced to 58.

```
mysql> INSERT INTO PU_admission (student_id, college_id, admission_date) VALUES (3, 1, CURDATE());
Query OK, 1 row affected (0.03 sec)
```

```
mysql> select * from pu_college;
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
| college_id | name               | address            | type    | annual_fee | capacity | contact_email | contact_phone | college_description |
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
|          1 | RV PU College      | Jayanagar 3rd block | Science |  100000.00 |       58 | rvpu@edu      | 123456789     | IIT JEE Batch       |
|          2 | Jain college       | RR Nagar           | Science |   80000.00 |      120 | jain@edu      | 12927652956   | jee integrated      |
|          4 | Christ PU College  | Koramangla         | Science |  120000.00 |       78 | christ@edu    | 268729        | Science college     |
|          6 | Brigade PU College | JP Nagar           | Science |  100000.00 |      120 | brigade@edu   | 9384739       | PU College          |
+------------+--------------------+--------------------+---------+------------+----------+---------------+---------------+---------------------+
4 rows in set (0.00 sec)
```

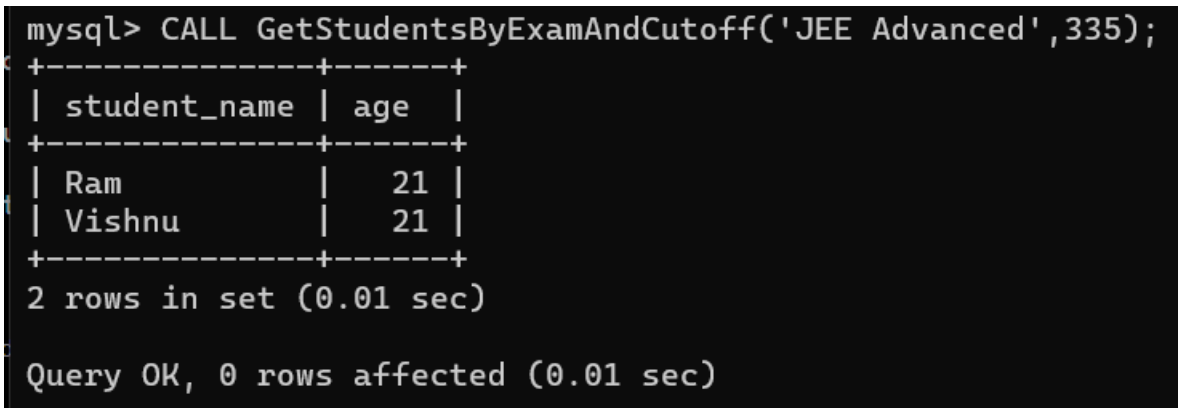
Procedure –

```
DELIMITER //


CREATE PROCEDURE GetStudentsByExamAndCutoff(
    IN exam_name_param VARCHAR(255),
    IN cutoff_marks_param DECIMAL(10, 2)
)
BEGIN
    SELECT
        s.student_name,
        YEAR(CURDATE()) - YEAR(s.date_of_birth) AS age
    FROM
```

```
    student s
JOIN
    result2 r ON s.student_id = r.student_id
JOIN
    exam2 e ON r.exam_id = e.exam_id
WHERE
    e.exam_name = exam_name_param
    AND r.status = 'PASS'
    AND r.percent_marks >= cutoff_marks_param;
END //

DELIMITER ;
```

- The above procedure is used to display the name and age of students who have cleared that particular exam.

```
CALL GetStudentsByExamAndCutoff('JEE Advanced',335);
```



Queries –

1. Admission to a PU College –

```
mysql> INSERT INTO PU_admission (student_id, college_id, admission_date) VALUES (100, 2, CURDATE());
Query OK, 1 row affected (0.00 sec)
```

2. Query to display the campus information of a University –

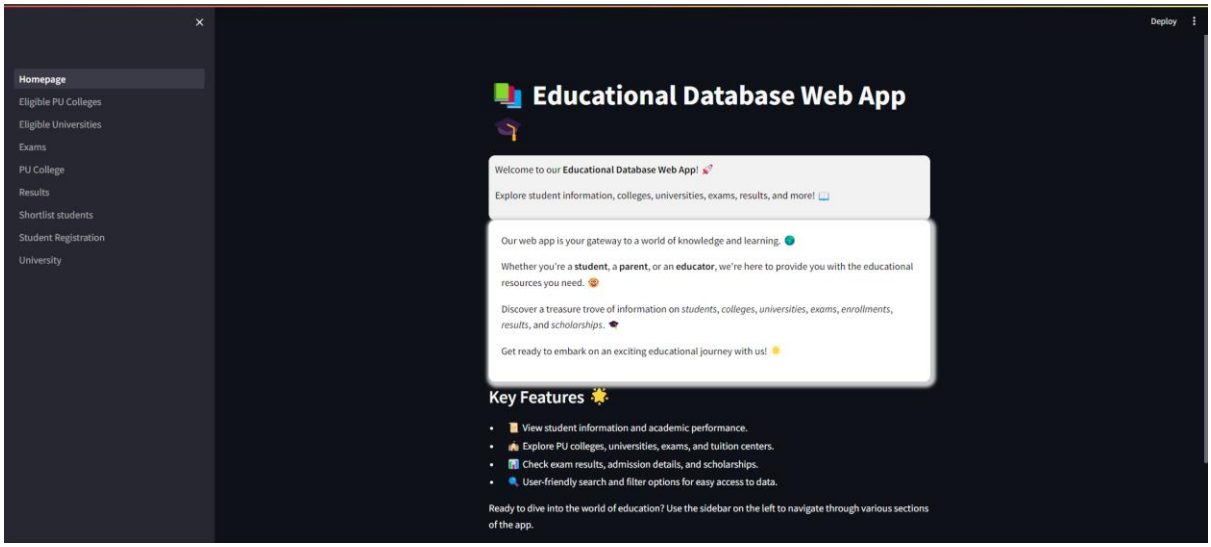
```
mysql> CALL GetCampusInfo("PESU");
+---------------+--------+------------+-----------+----------+--------------+-----------------+
| university_id | campus | annual_fee | location  | capacity | NIRF_ranking | university_name |
+---------------+--------+------------+-----------+----------+--------------+-----------------+
|            12 | RR     |  340000.00 | Bangalore |      719 |           12 | PESU            |
+---------------+--------+------------+-----------+----------+--------------+-----------------+
1 row in set (0.01 sec)

Query OK, 0 rows affected (0.03 sec)
```

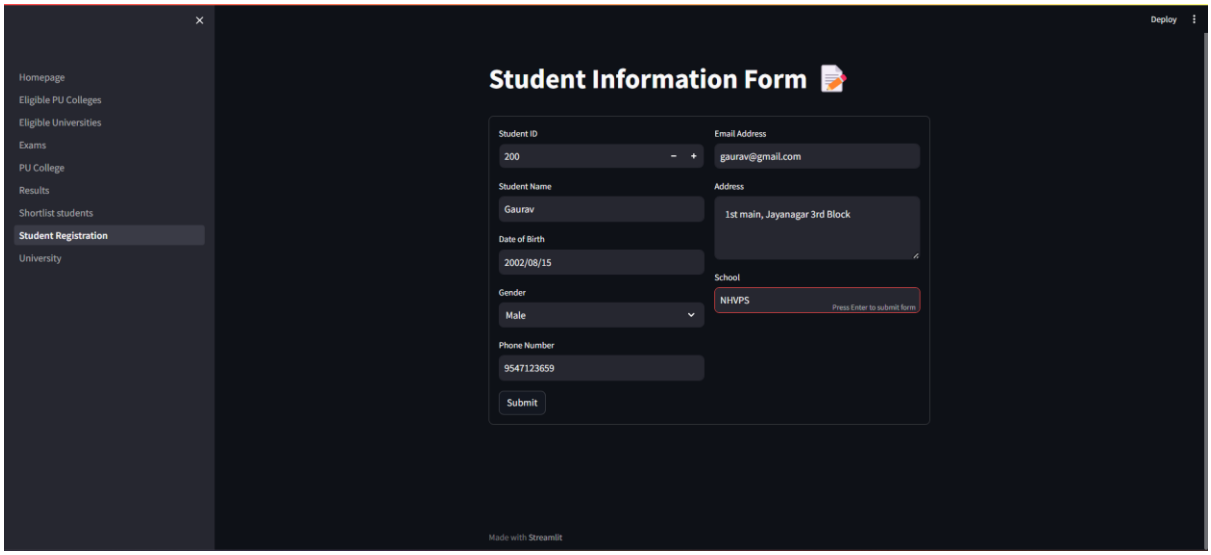
3. Query to retrieve the name and age of students who have cleared an exam -

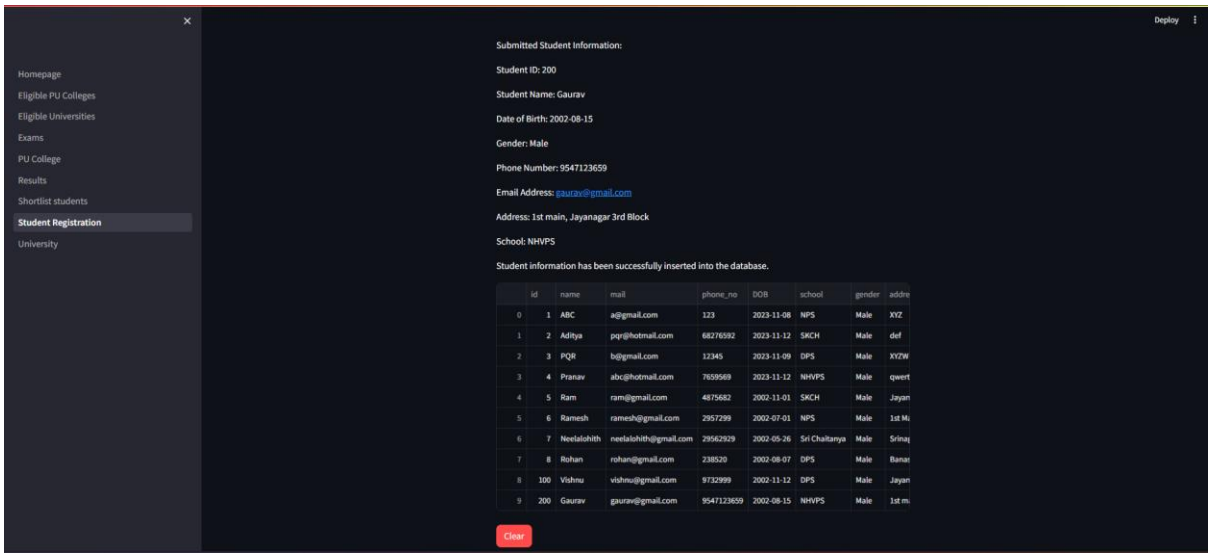
```
mysql> CALL GetStudentsByExamAndCutoff('JEE Advanced',335);
+--------------+------+
| student_name | age  |
+--------------+------+
| Ram          |   21 |
| Vishnu       |   21 |
+--------------+------+
2 rows in set (0.01 sec)

Query OK, 0 rows affected (0.01 sec)
```

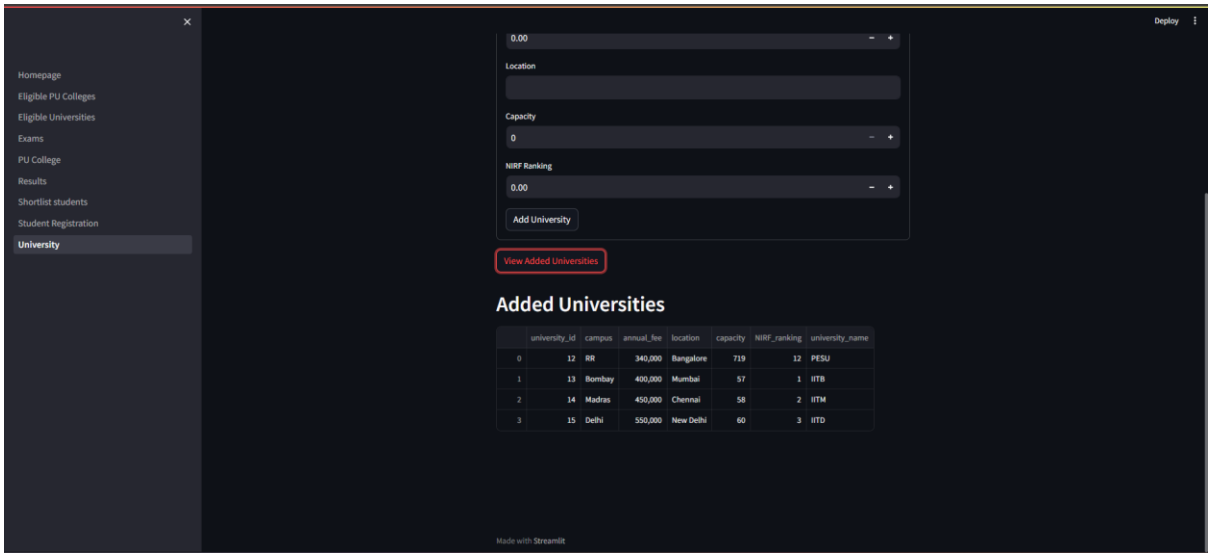
4. Query to display all eligible universities -

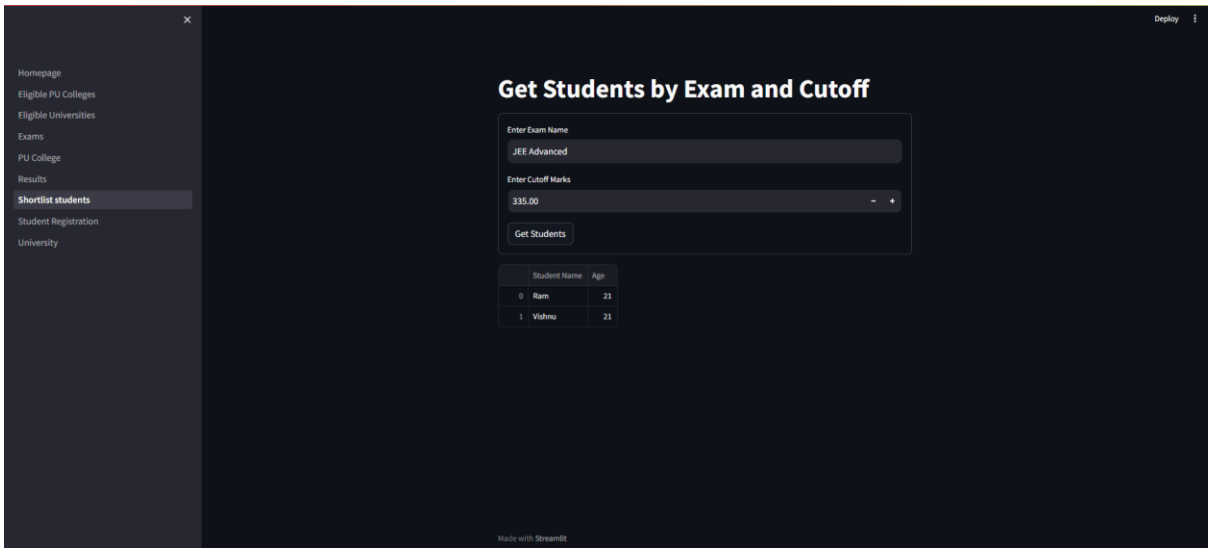
```
mysql> CALL DisplayEligibleInstitutionsForStudent_University(100,'JEE Advanced',355);
+----------------+---------------+
| Institute_name | university_id |
+----------------+---------------+
| IITB           |            13 |
| IITM           |            14 |
| IITD           |            15 |
+----------------+---------------+
3 rows in set (0.00 sec)

Query OK, 0 rows affected (0.02 sec)
```

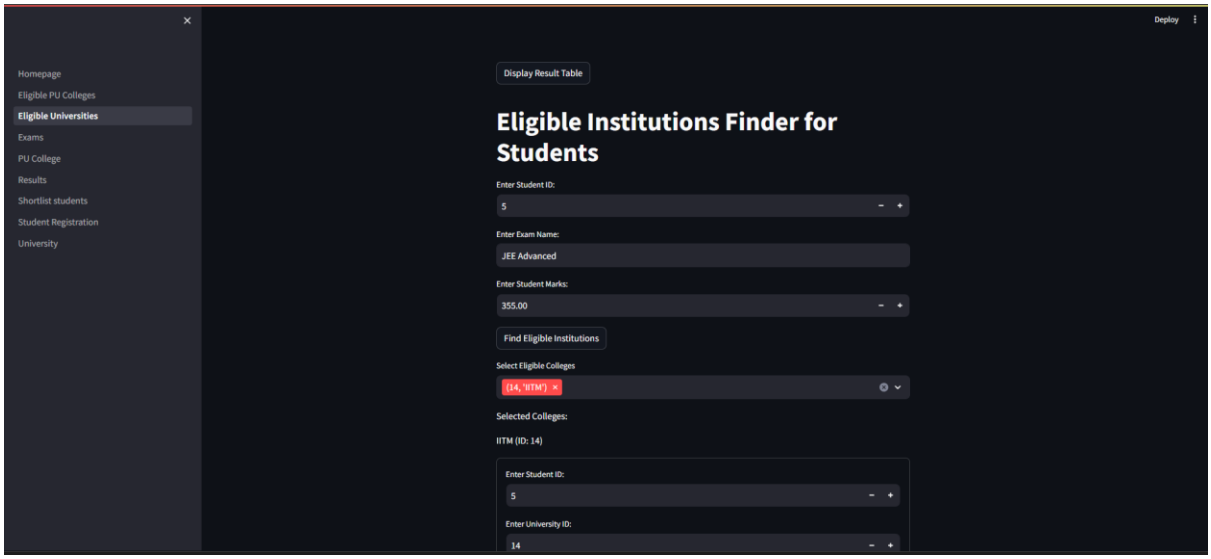

Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Educational Database Web App
Welcome to our Educational Database Web App!
Explore student information, colleges, universities, exams, results, and more!
Our web app is your gateway to a world of knowledge and learning.
Whether you're a student, a parent, or an educator, we're here to provide you with the educational resources you need.
Discover a treasure trove of information on students, colleges, universities, exams, enrollments, results, and scholarships.
Get ready to embark on an exciting educational journey with us!
Key Features
View student information and academic performance.
Explore PU colleges, universities, exams, and tuition centers.
Check exam results, admission details, and scholarships.
User-friendly search and filter options for easy access to data.
Ready to dive into the world of education? Use the sidebar on the left to navigate through various sections of the app.

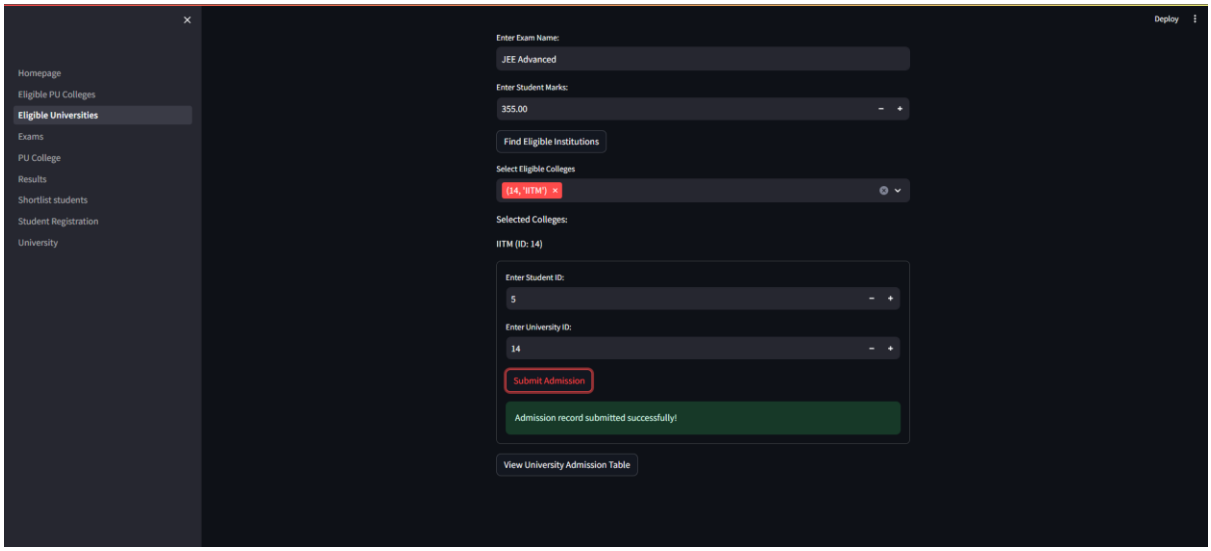

Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Student Information Form
Student ID
200
Email Address
gaurav@gmail.com
Student Name
Gaurav
Address
1st main, Jayanagar 3rd Block
Date of Birth
2002/08/15
School
NHVPS
Press Enter to submit form
Gender
Male
Phone Number
9547123659
Submit
Made with Streamlit


Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Submitted Student Information:
Student ID: 200
Student Name: Gaurav
Date of Birth: 2002-08-15
Gender: Male
Phone Number: 9547123659
Email Address: gaurav@gmail.com
Address: 1st main, Jayanagar 3rd Block
School: NHVPS
Student information has been successfully inserted into the database.
id name mail phone_no DOB school gender addre
0 1 ABC a@gmail.com 123 2023-11-08 NPS Male XYZ
1 2 Aditya pqr@hotmail.com 68276592 2023-11-12 SKCH Male def
2 3 PQR b@gmail.com 12345 2023-11-09 DPS Male XYZW
3 4 Pranav abc@hotmail.com 7659569 2023-11-12 NHVPS Male qwert
4 5 Ram ram@gmail.com 4875682 2002-11-01 SKCH Male Jayan
5 6 Ramesh ramesh@gmail.com 2957299 2002-07-01 NPS Male 1st M
6 7 Neelalohith neelalohith@gmail.com 29562929 2002-05-26 Sri Chaitanya Male Srinaj
7 8 Rohan rohan@gmail.com 238520 2002-08-07 DPS Male Banas
8 100 Vishnu vishnu@gmail.com 9732999 2002-11-12 DPS Male Jayan
9 200 Gaurav gaurav@gmail.com 9547123659 2002-08-15 NHVPS Male 1st m
Clear


Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
0.00
Location
Capacity
0
NIRF Ranking
0.00
Add University
View Added Universities
Added Universities
university_id campus annual_fee location capacity NIRF_ranking university_name
0 12 RR 340,000 Bangalore 719 12 PESU
1 13 Bombay 400,000 Mumbai 57 1 IITB
2 14 Madras 450,000 Chennai 58 2 IITM
3 15 Delhi 550,000 New Delhi 60 3 IITD
Made with Streamlit


Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Get Students by Exam and Cutoff
Enter Exam Name
JEE Advanced
Enter Cutoff Marks
335.00
Get Students
Student Name Age
0 Ram 21
1 Vishnu 21
Made with Streamlit


Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Display Result Table
Eligible Institutions Finder for Students
Enter Student ID:
5
Enter Exam Name:
JEE Advanced
Enter Student Marks:
355.00
Find Eligible Institutions
Select Eligible Colleges
(14, 'IITM')
Selected Colleges:
IITM (ID: 14)
Enter Student ID:
5
Enter University ID:
14


Deploy
Homepage
Eligible PU Colleges
Eligible Universities
Exams
PU College
Results
Shortlist students
Student Registration
University
Enter Exam Name:
JEE Advanced
Enter Student Marks:
355.00
Find Eligible Institutions
Select Eligible Colleges
(14, 'IITM')
Selected Colleges:
IITM (ID: 14)
Enter Student ID:
5
Enter University ID:
14
Submit Admission
Admission record submitted successfully!
View University Admission Table