Database Management System
Mini Project
Project Report
Exam Centre Management System

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Introduction

The Exam Centre Management System is a comprehensive platform designed to streamline and automate the management of exams, student registrations, and results. This system provides distinct interfaces for both students and administrators, facilitating efficient data management and enhancing the overall examination process.

System Architecture

The system is built using Streamlit for the user interface and MySQL as the relational database management system. The architecture includes separate functionalities for student and admin views, each encapsulated in modular scripts.

Database Design

The MySQL database, named **exam_centre_db**, is carefully structured to store essential information about students, exams, registrations, results, and exam centre. Triggers and stored procedures are utilized for tasks such as calculating student age and displaying exam data.

User Interface

Streamlit is employed to create a user-friendly interface for both students and administrators. The UI is modular, with distinct functionalities encapsulated in separate scripts for clarity and maintainability.

Features:

3.1 Student View

- **Student Details Display:**

  - Students can view their personal details, including name, email, date of birth, age, and address.

  - Details are fetched from the **Student** table in the database.

- **Exam Table Display:**

  - A display of the exam table is provided, showcasing essential information about exams, including ID, name, date, duration, and total marks.

  - The **display_exam_table** stored procedure is utilized for efficient data retrieval.

- **Most Registered Exams Chart:**

  - A dynamic chart is generated to visualize the top 5 exams with the most registrations.

- **Result and Registration Options:**

  - Students can choose to view results or register for exams.

  - Result and registration details are handled in separate modules (**std_result_page** and **std_reg_page**).

3.2 Admin View

- **Admin Authentication:**

  - Administrators are required to log in with valid credentials, enhancing system security.

- **Registered Students Display:**

  - Admins can view a list of registered students, including registration date, student ID, exam ID, and exam name.

- **Most Registered Exams Chart:**

  - Similar to the student view, admins can view a chart of the top 5 exams with the most registrations.

- **View Options:**

  - Admins can select from different views, including exam list, exam center list, and results.

  - Each view is handled in separate modules (**ad_exam_list**, **ad_result**, and **ad_exam_center**).

4. Security

- **User Authentication:**

    - Both student and admin interfaces require valid login credentials for access, ensuring secure system entry.

- **Password Security:**

    - Passwords are securely stored in the database, and the system could benefit from further enhancements such as hashing and salting for added security.
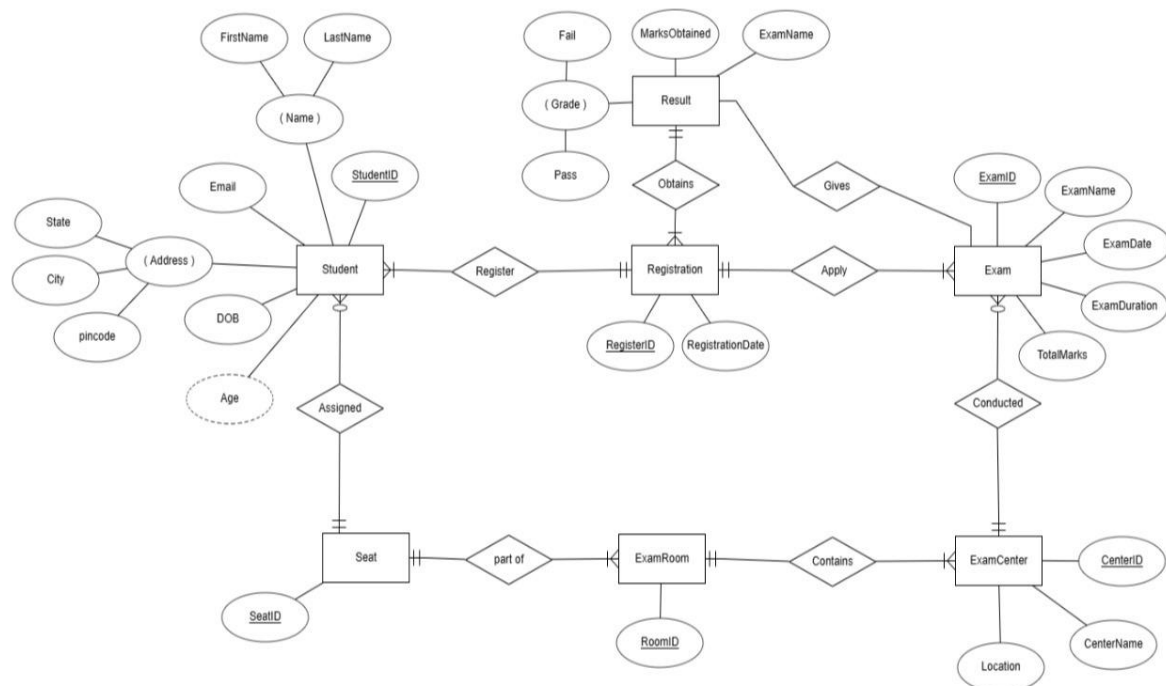
5. Testing

- **Comprehensive Testing:**

    - The system has undergone thorough testing to ensure the correctness of functionalities.

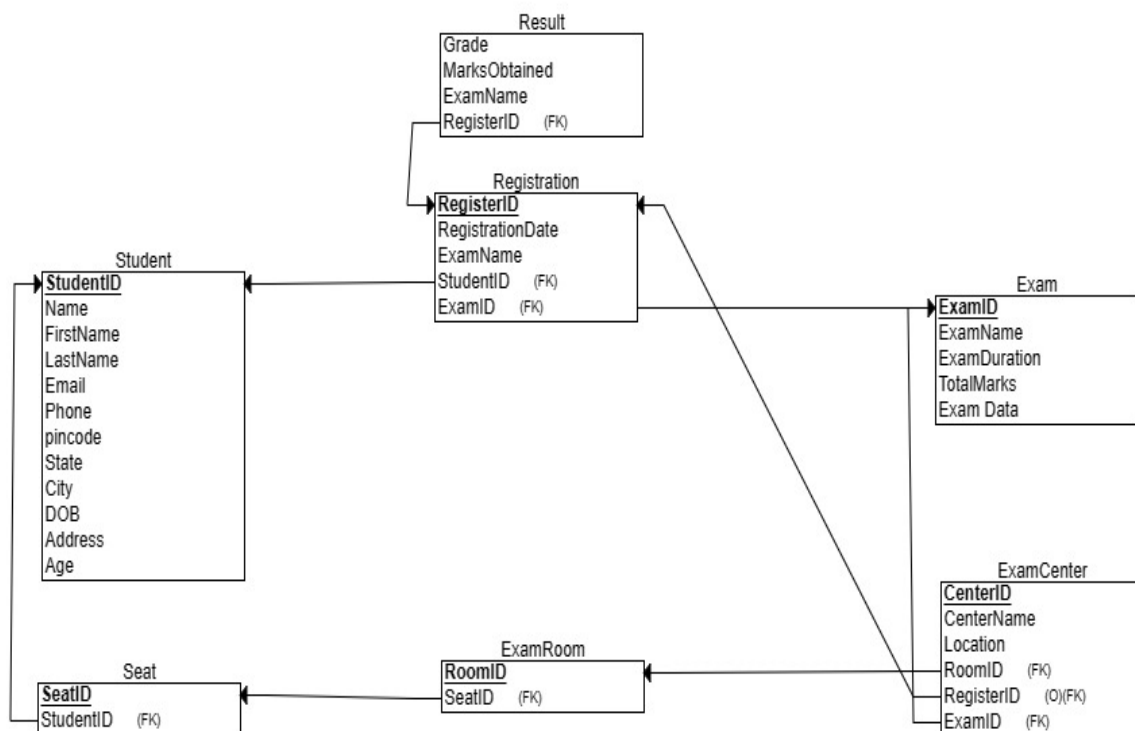   - Extensive testing scenarios, including boundary cases, have been considered.

6. Future Enhancements

- **Scalability:**

    - The system architecture is designed to accommodate future enhancements, such as additional features and increased scalability.

- **User Feedback Implementation:**

    - Collecting user feedback and incorporating improvements based on user experience is a potential area for future development.

ER Diagram

Student entity attributes: FirstName, LastName, (Name), StudentID, Email, (Address), State, City, pincode, DOB, Age

Result entity attributes: Fail, (Grade), Pass, MarksObtained, ExamName

Registration entity attributes: RegisterID, RegistrationDate

Exam entity attributes: ExamID, ExamName, ExamDate, ExamDuration, TotalMarks

Seat entity attributes: SeatID

ExamRoom entity attributes: RoomID

ExamCenter entity attributes: CenterID, CenterName, Location

Relationships: Register, Obtains, Gives, Apply, Assigned, Conducted, part of, Contains

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Relational Schema

Result
- Grade
- MarksObtained
- ExamName
- RegisterID (FK)

Registration
- RegisterID
- RegistrationDate
- ExamName
- StudentID (FK)
- ExamID (FK)

Student
- StudentID
- Name
- FirstName
- LastName
- Email
- Phone
- pincode
- State
- City
- DOB
- Address
- Age

Exam
- ExamID
- ExamName
- ExamDuration
- TotalMarks
- Exam Data

ExamCenter
- CenterID
- CenterName
- Location
- RoomID (FK)
- RegisterID (O)(FK)
- ExamID (FK)

ExamRoom
- RoomID
- SeatID (FK)

Seat
- SeatID
- StudentID (FK)

Database

```sql
drop database exam_center_db;

show databases;
create database exam_center_db;
use exam_center_db;
show tables;

CREATE TABLE users (
    id VARCHAR(225) PRIMARY KEY,
    password VARCHAR(255) NOT NULL
);

INSERT INTO users (id, password) VALUES ('A001', 'adminpassword');

-- Create the Student table
CREATE TABLE Student (
    StudentID VARCHAR(100) PRIMARY KEY,
    first_name varchar(100),
    last_name  varchar(100),
    Name varchar(200) as (concat_ws(' ', first_name, last_name)),
    Email VARCHAR(100),
    Address VARCHAR(100),
    State varchar(100),
    City varchar(100),
    Pincode varchar(100),
    AddressS varchar(400) AS (concat_ws(' ', State, City, Pincode)),
    DateOfBirth DATE,
    Age INT
);

DELIMITER //

CREATE TRIGGER calculate_age
BEFORE INSERT ON Student
FOR EACH ROW
BEGIN
    SET NEW.Age = YEAR(CURDATE()) - YEAR(NEW.DateOfBirth);
END;

CREATE TRIGGER update_age
BEFORE UPDATE ON Student
FOR EACH ROW
BEGIN
    SET NEW.Age = YEAR(CURDATE()) - YEAR(NEW.DateOfBirth);
END;
```

```sql
//
DELIMITER ;

INSERT INTO Student (StudentID, first_name, last_name, Email, Address, State,
City, Pincode, DateOfBirth)
VALUES
('S001', 'John', 'Doe', 'john.doe@email.com', '123 Main St', 'California',
'Los Angeles', '90001', '1990-05-15'),
('S002', 'Jane', 'Smith', 'jane.smith@email.com', '456 Oak St', 'New York',
'New York City', '10001', '1992-08-22'),
('S003', 'Alice', 'Johnson', 'alice.johnson@email.com', '789 Pine St',
'Texas', 'Houston', '77002', '1995-03-10'),
('S004', 'Bob', 'Williams', 'bob.williams@email.com', '101 Elm St', 'Florida',
'Miami', '33101', '1991-11-30'),
('S005', 'Eva', 'Miller', 'eva.miller@email.com', '202 Cedar St', 'Illinois',
'Chicago', '60601', '1993-07-18'),
('S006', 'David', 'Davis', 'david.davis@email.com', '303 Walnut St', 'Ohio',
'Columbus', '43201', '1994-09-25'),
('S007', 'Grace', 'Brown', 'grace.brown@email.com', '404 Maple St', 'Arizona',
'Phoenix', '85001', '1996-02-03'),
('S008', 'Charlie', 'Jones', 'charlie.jones@email.com', '505 Birch St',
'Colorado', 'Denver', '80202', '1990-12-14'),
('S009', 'Olivia', 'White', 'olivia.white@email.com', '606 Oak St',
'Washington', 'Seattle', '98101', '1992-06-08'),
('S010', 'Michael', 'Moore', 'michael.moore@email.com', '707 Pine St',
'Georgia', 'Atlanta', '30301', '1994-04-05');

-- Create the Exam table
CREATE TABLE Exam (
    ExamID VARCHAR(100) PRIMARY KEY,
    ExamName VARCHAR(100),
    ExamDate DATE,
    ExamDuration INT,
    TotalMarks INT
);

desc table exam;
INSERT INTO Exam (ExamID, ExamName, ExamDate, ExamDuration, TotalMarks)
VALUES
('E001', 'Math Exam', '2023-12-01', 120, 100),
('E002', 'Science Exam', '2023-12-05', 90, 80),
('E003', 'History Exam', '2023-12-10', 60, 50),
('E004', 'English Exam', '2023-12-15', 75, 70),
('E005', 'Physics Exam', '2023-12-20', 100, 90),
('E006', 'Chemistry Exam', '2023-12-25', 80, 75),
('E007', 'Biology Exam', '2023-12-30', 70, 60),
('E008', 'Computer Science Exam', '2024-01-05', 45, 40),
('E009', 'Geography Exam', '2024-01-10', 55, 50),
```

```sql
('E010', 'Economics Exam', '2024-01-15', 65, 60);

DELIMITER //

CREATE PROCEDURE display_exam_table()
BEGIN
    SELECT * FROM Exam;
END

DELIMITER ;


-- Create the ExamCenter table
CREATE TABLE ExamCenter (
    CenterID VARCHAR(100) PRIMARY KEY,
    CenterName VARCHAR(100),
    Location VARCHAR(100),
    RoomID VARCHAR(100),  -- Foreign key
    ExamID VARCHAR(100),  -- Foreign key
    RegisterID VARCHAR(100)  -- Foreign key
);
INSERT INTO ExamCenter (CenterID, CenterName, Location, RoomID, ExamID,
RegisterID)
VALUES
('C001', 'Center A', 'Location A', 'R001', 'E001', 'Reg001'),
('C002', 'Center B', 'Location B', 'R002', 'E002', 'Reg002'),
('C003', 'Center C', 'Location C', 'R003', 'E003', 'Reg003'),
('C004', 'Center D', 'Location D', 'R004', 'E004', 'Reg004'),
('C005', 'Center E', 'Location E', 'R005', 'E005', 'Reg005'),
('C006', 'Center F', 'Location F', 'R006', 'E006', 'Reg006'),
('C007', 'Center G', 'Location G', 'R007', 'E007', 'Reg007'),
('C008', 'Center H', 'Location H', 'R008', 'E008', 'Reg008'),
('C009', 'Center I', 'Location I', 'R009', 'E009', 'Reg009'),
('C010', 'Center J', 'Location J', 'R010', 'E010', 'Reg010');


-- Create the ExamRoom table
CREATE TABLE ExamRoom (
    RoomID VARCHAR(100) PRIMARY KEY,
    SeatID VARCHAR(100)  -- Foreign key
);
INSERT INTO ExamRoom (RoomID, SeatID)
VALUES
('R001', 'Seat001'),
('R002', 'Seat002'),
('R003', 'Seat003'),
('R004', 'Seat004'),
('R005', 'Seat005'),
('R006', 'Seat006'),
```

```sql
('R007', 'Seat007'),
('R008', 'Seat008'),
('R009', 'Seat009'),
('R010', 'Seat010');


-- Create the Seat table
CREATE TABLE Seat (
    SeatID VARCHAR(100) PRIMARY KEY,
    StudentID VARCHAR(100)  -- Foreign key
);
INSERT INTO Seat (SeatID, StudentID)
VALUES
('Seat001', 'S001'),
('Seat002', 'S002'),
('Seat003', 'S003'),
('Seat004', 'S004'),
('Seat005', 'S005'),
('Seat006', 'S006'),
('Seat007', 'S007'),
('Seat008', 'S008'),
('Seat009', 'S009'),
('Seat010', 'S010');


-- Create the Registration table
CREATE TABLE Registration (
    RegisterID VARCHAR(100) PRIMARY KEY,
    RegistrationDate DATE,
    StudentID VARCHAR(100),  -- Foreign key
    ExamID VARCHAR(100)  -- Foreign key
);

ALTER TABLE Registration
ADD COLUMN ExamName VARCHAR(100);

-- Update ExamName in Registration table using JOIN
UPDATE Registration
JOIN Exam ON Registration.ExamID = Exam.ExamID
SET Registration.ExamName = Exam.ExamName;

INSERT INTO Registration (RegisterID, RegistrationDate, StudentID, ExamID)
VALUES
('Reg001', '2023-11-01', 'S001', 'E001'),
('Reg002', '2023-11-02', 'S002', 'E002'),
('Reg003', '2023-11-03', 'S003', 'E003'),
('Reg004', '2023-11-04', 'S004', 'E004'),
('Reg005', '2023-11-05', 'S005', 'E005'),
('Reg006', '2023-11-06', 'S006', 'E006'),
```

```sql
    ('Reg007', '2023-11-07', 'S007', 'E007'),
    ('Reg008', '2023-11-08', 'S008', 'E008'),
    ('Reg009', '2023-11-09', 'S009', 'E009'),
    ('Reg010', '2023-11-10', 'S010', 'E010');

drop table registration;

-- Create the Result table
CREATE TABLE Result (
    RegisterID VARCHAR(100),  -- Foreign key
    MarksObtained INT,
    Grade enum ("pass", "fail"),
    ExamName VARCHAR(100)  -- Foreign key
);
INSERT INTO Result (RegisterID, MarksObtained, Grade, ExamName)
VALUES
('Reg001', 90, 'pass', 'Math Exam'),
('Reg002', 75, 'pass', 'Science Exam'),
('Reg003', 50, 'fail', 'History Exam'),
('Reg004', 70, 'pass', 'English Exam'),
('Reg005', 95, 'pass', 'Physics Exam'),
('Reg006', 80, 'pass', 'Chemistry Exam'),
('Reg007', 55, 'fail', 'Biology Exam'),
('Reg008', 40, 'fail', 'Computer Science Exam'),
('Reg009', 60, 'pass', 'Geography Exam'),
('Reg010', 75, 'pass', 'Economics Exam');


-- Add foreign keys to the ExamCenter table
ALTER TABLE ExamCenter
ADD FOREIGN KEY (RoomID) REFERENCES ExamRoom(RoomID),
ADD FOREIGN KEY (ExamID) REFERENCES Exam(ExamID),
ADD FOREIGN KEY (RegisterID) REFERENCES Registration(RegisterID);

-- Add foreign keys to the ExamRoom table
ALTER TABLE ExamRoom
ADD FOREIGN KEY (SeatID) REFERENCES Seat(SeatID);

-- Add foreign keys to the Seat table
ALTER TABLE Seat
ADD FOREIGN KEY (StudentID) REFERENCES Student(StudentID);

-- Add foreign keys to the Registration table
ALTER TABLE Registration
ADD FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
ADD FOREIGN KEY (ExamID) REFERENCES Exam(ExamID);
-- Add foreign keys to the Result table
ALTER TABLE Result
ADD FOREIGN KEY (RegisterID) REFERENCES Registration(RegisterID);
```
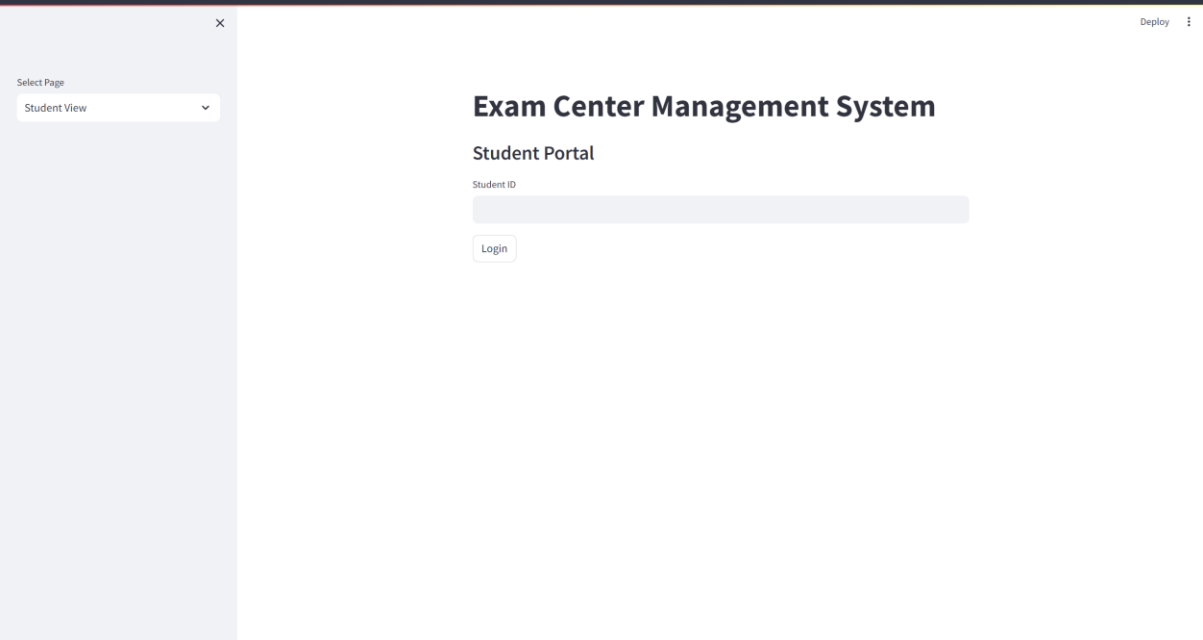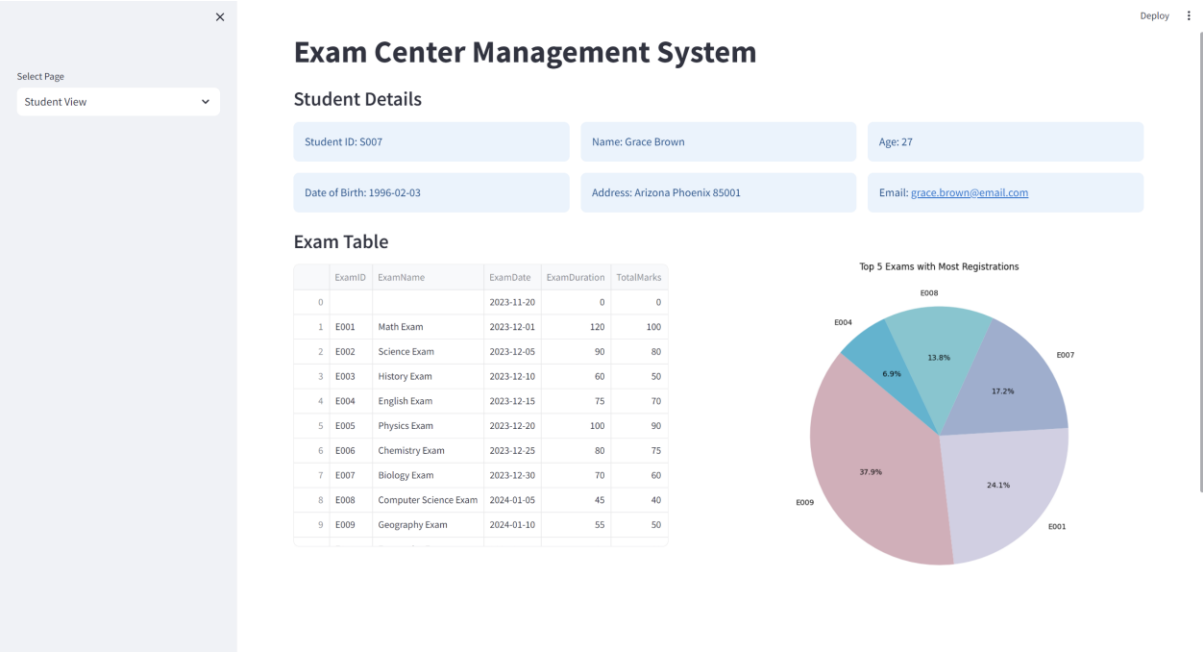
Output

STUDENT VIEW:

Student Login Page

Student Main page

Result of an exam

| 9 | E009 | Geography Exam | 2024-01-10 | 55 | 50 |
| 10 | E010 | Economics Exam | 2024-01-15 | 65 | 60 |

Result Or Registeration

Select Option
Result ⌄

View Result

Enter Student ID
S007

[View Result]

| Register ID: Reg007 | Marks Obtained: 55 |
| Exam: Biology Exam | Grade: fail |

Register for an exam

Select Page
Student View ⌄

Result Or Registeration

Select Option
Register ⌄

Exam Registration

Enter Student ID
S007

Enter Exam Name
Economics Exam

Enter Exam ID
E010

[Submit]

Registration Successful!

Registration Details

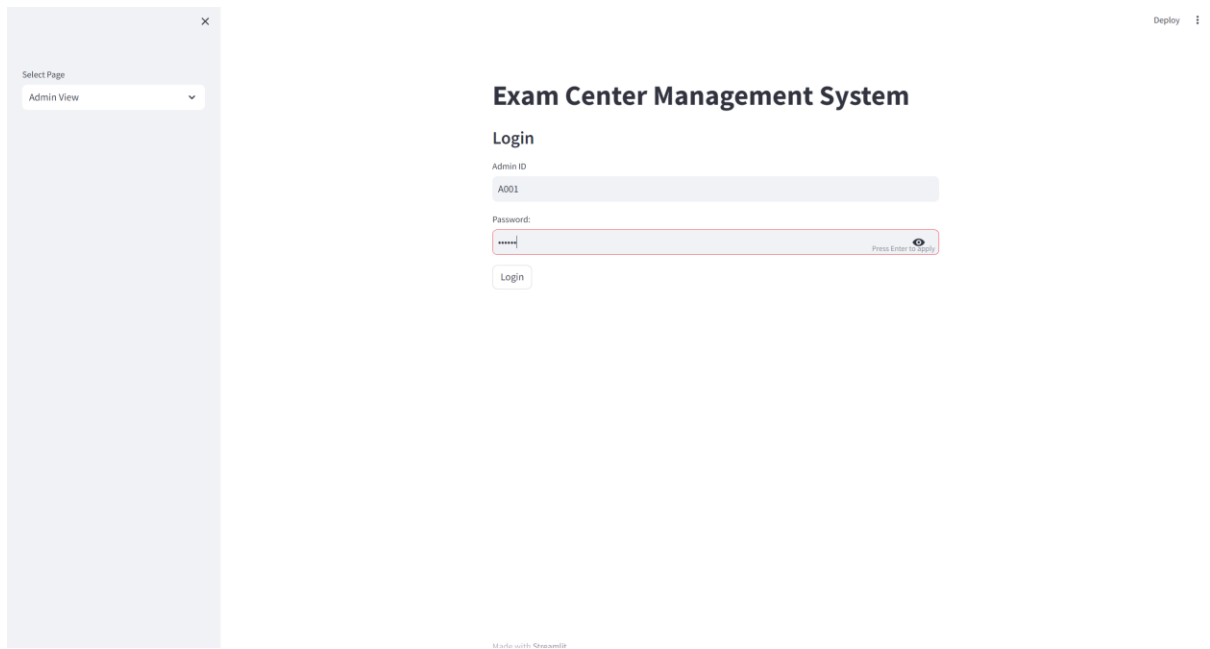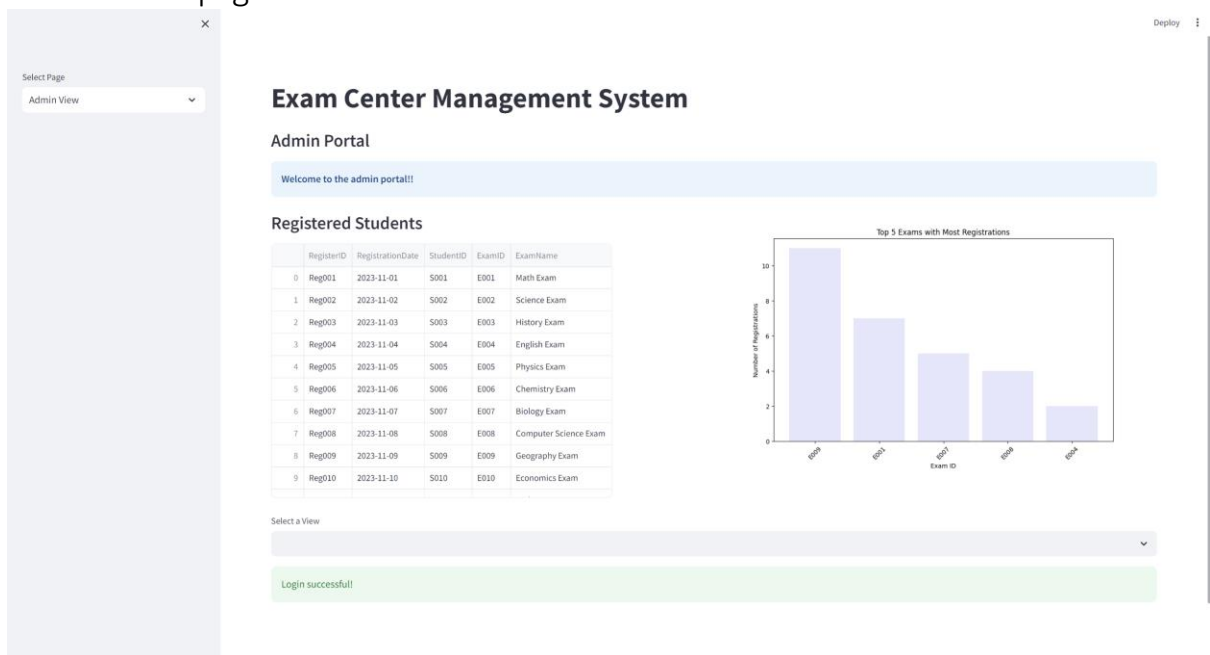| Registration ID: Reg673 | Registration Date: 2023-11-23 |
Student ID: S007	Student Name: Grace Brown
Exam ID: E010	Exam Date: 2024-01-15
Center Name: Center J	Center Location: Location J

Admin view:
Admin Login

Admin Home page:

Edit exam list:

	Reg	Date		ExamID	Exam
13	Reg064	2023-11-17	s007	E001	Math Exam
14	Reg108	2023-11-18	s001	E004	English Exam
15	Reg191	2023-11-21	S004	E009	None
16	Reg1CE	2023-11-18	S001	E001	Math Exam

Select a View

Exam List ⌄

Select Option

View Table ⌄

Exam Table

	ExamID	ExamName	ExamDate	ExamDuration	TotalMarks
1	E001	Math Exam	2023-12-01	120	100
2	E002	Science Exam	2023-12-05	90	80
3	E003	History Exam	2023-12-10	60	50
4	E004	English Exam	2023-12-15	75	70
5	E005	Physics Exam	2023-12-20	100	90
6	E006	Chemistry Exam	2023-12-25	80	75
7	E007	Biology Exam	2023-12-30	70	60
8	E008	Computer Science Exam	2024-01-05	45	40
9	E009	Geography Exam	2024-01-10	55	50
10	E010	Economics Exam	2024-01-15	65	60

Select a View

Exam List ⌄

Select Option

Add ⌄

Edit

Exam ID

E023

Exam Name

CET

Exam Duration

120.00   − +

Exam Date

2023/11/23

Marks

100.00   − +

Add

Updated successfully

Exam Table

	ExamID	ExamName	ExamDate	ExamDuration	TotalMarks
2	E002	Science Exam	2023-12-05	90	80
3	E003	History Exam	2023-12-10	60	50
4	E004	English Exam	2023-12-15	75	70
5	E005	Physics Exam	2023-12-20	100	90
6	E006	Chemistry Exam	2023-12-25	80	75
7	E007	Biology Exam	2023-12-30	70	60
8	E008	Computer Science Exam	2024-01-05	45	40
9	E009	Geography Exam	2024-01-10	55	50
10	E010	Economics Exam	2024-01-15	65	60
11	E023	CET	2023-11-23	120	100

✕

Select Page

| Admin View | ⌄ |

Select a View

| Exam List | ⌄ |

Select Option

| Delete | ⌄ |

Delete Exam Entry

Enter Exam ID to delete

| E023 |

[Delete]

Exam entry with ID E023 deleted successfully.

Exam Table

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	ExamID	ExamName	ExamDate	ExamDuration	TotalMarks
1	E001	Math Exam	2023-12-01	120	100
2	E002	Science Exam	2023-12-05	90	80
3	E003	History Exam	2023-12-10	60	50
4	E004	English Exam	2023-12-15	75	70
5	E005	Physics Exam	2023-12-20	100	90
6	E006	Chemistry Exam	2023-12-25	80	75
7	E007	Biology Exam	2023-12-30	70	60
8	E008	Computer Science Exam	2024-01-05	45	40
9	E009	Geography Exam	2024-01-10	55	50
10	E010	Economics Exam	2024-01-15	65	60

Edit Exam Center

✕

Select Page

| Admin View | ⌄ |

29	Reg8B0	2023-11-17	S003	E009	Geography Exam
30	RegA13	2023-11-20	S009	E001	Math Exam
31	RegBB9	2023-11-23	S005	E009	None
32	RegE14	2023-11-19	S006	E001	Math Exam
33	RegE99	2023-11-19	s005	E001	Math Exam
34	RegEUS	2023-11-18	S001	E007	Biology Exam
35	RegFBE	2023-11-18	S001	E005	Physics Exam

Select a View

| Exam Center List | ⌄ |

Exam Center

Select Option

| View Table | ⌄ |

Exam Centre Table

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	CenterID	CenterName	Location	RoomID	ExamID	RegisterID
0	C002	Center B	Location B	R002	E002	Reg002
1	C004	Center D	Location D	R004	E004	Reg004
2	C005	Center E	Location E	R005	E005	Reg005
3	C006	Center F	Location F	R006	E006	Reg006
4	C007	Center G	Location G	R007	E007	Reg007
5	C008	Center H	Location H	R008	E008	Reg008
6	C009	Center I	Location I	R009	E009	Reg009
7	C010	Center J	Location J	R010	E010	Reg010
8	C013	center 66	Andhra Pradesh	None	None	None

Exam Center

Select Option

Add ▾

Edit

Center ID

C088

Center Name

Centerz

Select Location

Andhra Pradesh ▾

Add

Updated successfully

Exam Centre Table

	CenterID	CenterName	Location	RoomID	ExamID	RegisterID
0	C002	Center B	Location B	R002	E002	Reg002
1	C004	Center D	Location D	R004	E004	Reg004
2	C005	Center E	Location E	R005	E005	Reg005
3	C006	Center F	Location F	R006	E006	Reg006
4	C007	Center G	Location G	R007	E007	Reg007
5	C008	Center H	Location H	R008	E008	Reg008
6	C009	Center I	Location I	R009	E009	Reg009
7	C010	Center J	Location J	R010	E010	Reg010
8	C013	center 66	Andhra Pradesh	None	None	None
9	C088	Centerz	Andhra Pradesh	None	None	None

Select Page

Admin View ▾

Select a View

Exam Center List ▾

Exam Center

Select Option

Delete ▾

Delete Exam Entry

Enter Centre ID to delete

C088

Delete

Centre with ID C088 deleted successfully.

Exam Centre Table

	CenterID	CenterName	Location	RoomID	ExamID	RegisterID
0	C002	Center B	Location B	R002	E002	Reg002
1	C004	Center D	Location D	R004	E004	Reg004
2	C005	Center E	Location E	R005	E005	Reg005
3	C006	Center F	Location F	R006	E006	Reg006
4	C007	Center G	Location G	R007	E007	Reg007
5	C008	Center H	Location H	R008	E008	Reg008
6	C009	Center I	Location I	R009	E009	Reg009
7	C010	Center J	Location J	R010	E010	Reg010
8	C013	center 66	Andhra Pradesh	None	None	None

Select Page

Admin View ▾

Edit Result

	RegisterID			Exam Name
27	Reg7AC	2023-11-19	S009	E001	Math Exam
28	Reg7E4	2023-11-22	S003	E009	None
29	Reg8B0	2023-11-17	S003	E009	Geography Exam
30	RegA13	2023-11-20	S009	E001	Math Exam
31	RegBB9	2023-11-23	S005	E009	None
32	RegE14	2023-11-19	S006	E001	Math Exam
33	RegE99	2023-11-19	s005	E001	Math Exam
34	RegEU5	2023-11-18	S001	E007	Biology Exam
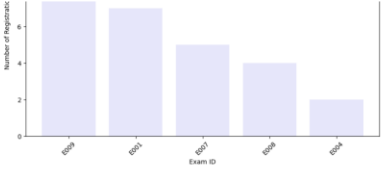
Select a View

Results

Results

Select Option

View Table

Results Table

	RegisterID	Marks Obtained	Grade	Exam Name
0	Reg001	90	pass	Math Exam
1	Reg003	50	fail	History Exam
2	Reg004	70	pass	English Exam
3	Reg005	95	pass	Physics Exam
4	Reg006	80	pass	Chemistry Exam
5	Reg007	55	fail	Biology Exam
6	Reg008	40	fail	Computer Science Exam
7	Reg5A1	90	pass	Geography Exam

Results

Select Option

Add

Add Result

Register ID

RegA13

Marks

20.00   − +

Exam Name

Math Exam

Select Grade
○ Pass
● Fail

Save Result

Result added successfully

Results Table

	RegisterID	Marks Obtained	Grade	Exam Name
0	Reg001	90	pass	Math Exam
1	Reg003	50	fail	History Exam
2	Reg004	70	pass	English Exam
3	Reg005	95	pass	Physics Exam
4	Reg006	80	pass	Chemistry Exam
5	Reg007	55	fail	Biology Exam
6	Reg008	40	fail	Computer Science Exam
7	Reg5A1	90	pass	Geography Exam
8	RegA13	20	fail	Math Exam

Select Page

Admin View

Exam ID

✕

Select Page

Admin View ⌄

Select a View

Results ⌄

Results

Select Option

Delete ⌄

Delete Result Entry

Enter Register ID to delete

RegA13

[Delete]

Result with Register ID RegA13 deleted successfully.

Results Table

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	RegisterID	Marks Obtained	Grade	Exam Name
0	Reg001	90	pass	Math Exam
1	Reg003	50	fail	History Exam
2	Reg004	70	pass	English Exam
3	Reg005	95	pass	Physics Exam
4	Reg006	80	pass	Chemistry Exam
5	Reg007	55	fail	Biology Exam
6	Reg008	40	fail	Computer Science Exam
7	Reg5A1	90	pass	Geography Exam

Conclusion

The Exam Center Management System is a robust solution for managing exams, registrations, and results efficiently. Leveraging Streamlit and MySQL, the system provides a user-friendly experience for both students and administrators. The modular structure and thoughtful database design contribute to the system's maintainability and extensibility.