

TASK 02: Lab Rescheduling Management System

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2022/E/048

2025/06/09

1. High Level Problem Summary

Efficient and conflict-free lab session rescheduling is not possible with the current manual and fragmented process, resulting in communication lapses, scheduling errors, and administrative inefficiencies.

Success will be measured by the implementation of a digital system that enables students to request lab rescheduling, automates approval workflows, notifies all stakeholders, and maintains a complete log of rescheduling activities.

The project scope includes:

- User management for students, subject coordinators, and lab instructors
- Digital request and approval workflow
- Automated email notifications
- Lab schedule and availability tracking
- Reporting and logs for lab usage and rescheduling history

Out of scope:

- Creation of the initial lab timetable
- Physical lab infrastructure management
- Integration with financial or academic calendar systems

2. Detailed Problem Statement

2.1 FUNCTION

The solution must:

- Allow students to submit lab rescheduling requests with supporting documents (e.g., faculty approval letter)
- Enable subject coordinators to review and approve/reject requests, and forward approved requests to lab instructors

- Notify all relevant parties (students, coordinators, instructors) via email about request status and schedule changes
- Track lab details (Lab ID, Name, Location, availability) and update schedules accordingly
- Record attendance for rescheduled sessions
- Generate reports on lab usage and rescheduling trends

Key features (in order of priority):

- Secure login for different user roles
- Request submission and approval workflow
- Automated notifications
- Schedule management and conflict checking
- Reporting and audit logs

2.2 TIME

Past:

Lab rescheduling was handled manually using paper forms, emails, or phone calls, often leading to lost requests, delayed approvals, and scheduling conflicts.

Present:

The new system will be used by students needing to reschedule labs, subject coordinators managing requests, and lab instructors updating schedules and attendance. It addresses the need for a centralized, efficient, and transparent process.

Future:

Potential extensions include integration with academic management systems, mobile app access, predictive analytics for lab utilization, and expansion to cover equipment booking and maintenance scheduling.

3. Key Stakeholders

- Students: Submit rescheduling requests and receive notifications
- Subject Coordinators: Approve/reject and manage requests
- Lab Instructors: Confirm reschedules and update attendance
- Academic Administration: Review reports and ensure policy compliance
- IT Support: Maintain and update the system

4. Revision History

Version	Date	Author	Description
1.0	2025/05/01	BANDARA H.G.T.D.	Initial problem statement created
1.1	2025/06/01	BANDARA H.G.T.D.	ER diagram completed and reviewed

Project Timeline & Milestones

- 2025/05/01: Project initiated, requirements gathering started
- 2025/05/10: Completed user role and workflow analysis
- 2025/05/20: Drafted system features and use cases
- 2025/06/01: ER diagram completed

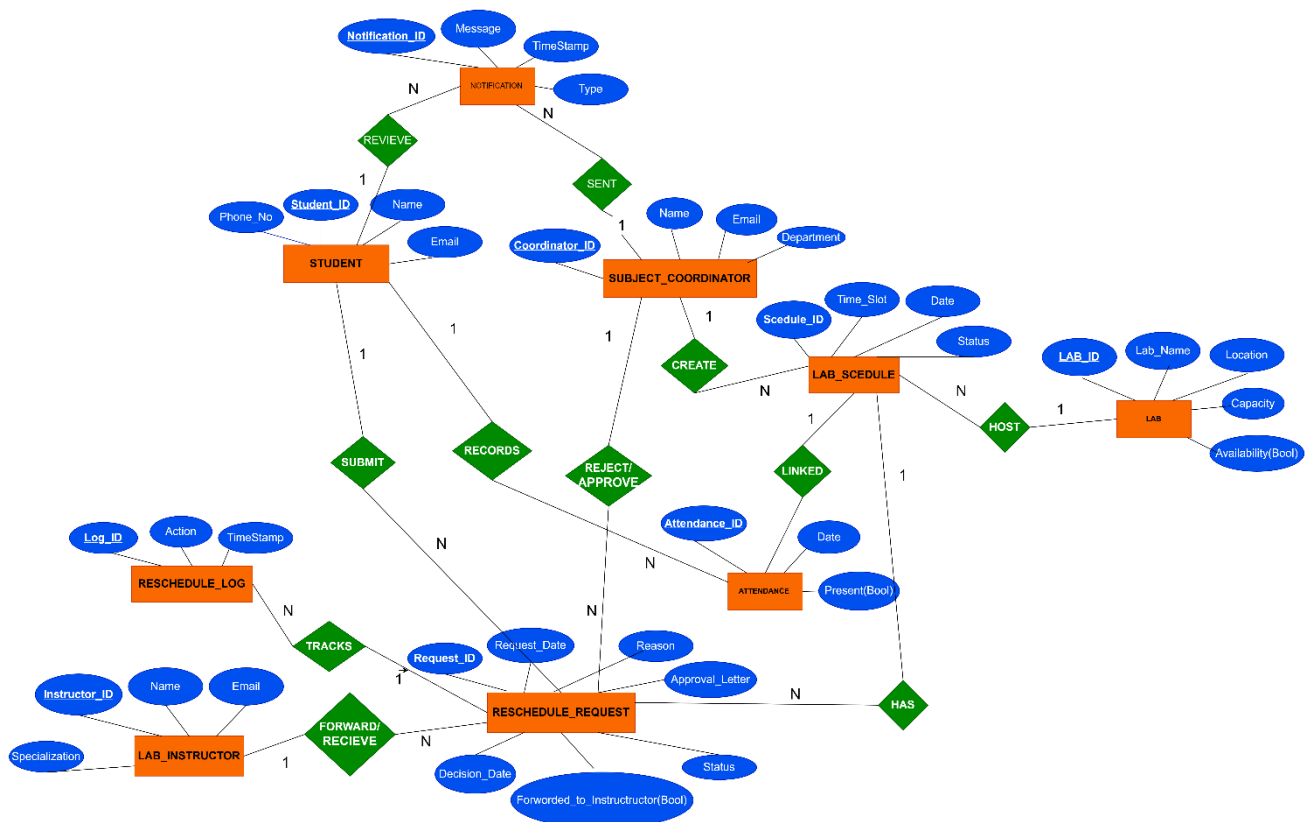


FIGURE 01: ER DIAGRAM IN VERSION (V1.1)

TASK 2.1: Data collection or created or a combination related to the project.

STUDENTS

StudentID	Name	Email	Phone
S001	Asha Singh	asha@univ.edu	9876543210
S002	Ravi Kumar	ravi@univ.edu	9123456789

SUBJECT COORDINATORS

CoordinatorID	Name	Email	Department
C001	Dr. Meera	meera@univ.edu	Computer Sci

LAB INSTRUCTORS

InstructorID	Name	Email	Specialization
L001	Mr. Joseph	joseph@univ.edu	Networking

LABS

LabID	LabName	Location	Capacity	Availability
LB01	Computer Lab 1	Block A	30	TRUE

LAB SCHEDULES

ScheduleID	LabID	CoordinatorID	TimeSlot	Date	Status
SCH01	LB01	C001	10:00-12:00	6/10/2025	Scheduled

RESCHEDULE REQUESTS

Request ID	Student ID	Schedule ID	Request Date	Reason	Approval Letter	Status	Forwarded ToInstructor	Decision Date
RQ001	S001	SCH01	6/5/2025	Medical reason	[file]	Pending	FALSE	NULL

NOTIFICATIONS

NotificationID	Message	Timestamp	Type	StudentID	CoordinatorID
N001	Your reschedule is approved.	6/6/2025 9:00	Email	S001	C001

ATTENDANCE

AttendanceID	StudentID	ScheduleID	Date	Present
A001	S001	SCH01	6/10/2025	TRUE

RESCHEDULE LOG

LogID	RequestID	Action	Timestamp
LOG01	RQ001	Submitted	6/5/2025 8:00

- **TASK 2.2:** THE REVISED ER DIAGRAM

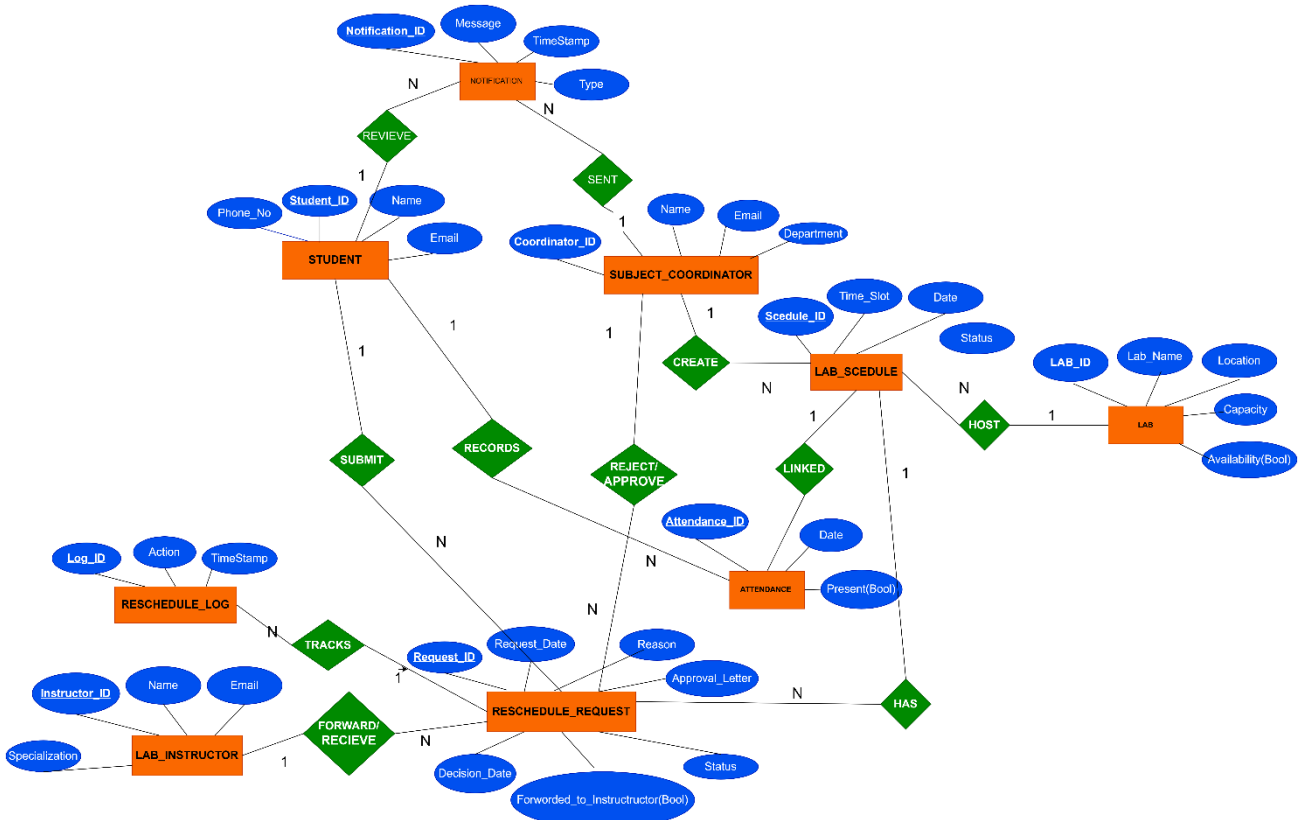


FIGURE 02: THE REVISED ER DIAGRAM (1.2)

TASK 2.3: TENTATIVE RELATION SCHEMAS

- ❖ **Student** (*StudentID PK*, Name, Email, Phone)
- ❖ **SubjectCoordinator** (*CoordinatorID PK*, Name, Email, Department)
- ❖ **LabInstructor** (*InstructorID PK*, Name, Email, Specialization)
- ❖ **Lab** (*LabID PK*, LabName, Location, Capacity, Availability)
- ❖ **LabSchedule** (*ScheduleID PK*, LabID FK, CoordinatorID FK, TimeSlot, Date, Status)
- ❖ **RescheduleRequest** (*RequestID PK*, StudentID FK, ScheduleID FK, RequestDate, Reason, ApprovalLetter, Status, ForwardedToInstructor, DecisionDate)
- ❖ **Notification** (*NotificationID PK*, Message, Timestamp, Type, StudentID FK, CoordinatorID FK)
- ❖ **Attendance** (*AttendanceID PK*, StudentID FK, ScheduleID FK, Date, Present)
- ❖ **RescheduleLog** (*LogID PK*, RequestID FK, Action, Timestamp)

Note: PK:- Primary Key, FK:- Foreign Key

TASK 2.4: THE QUERIES FOR CREATING THE DATABASE

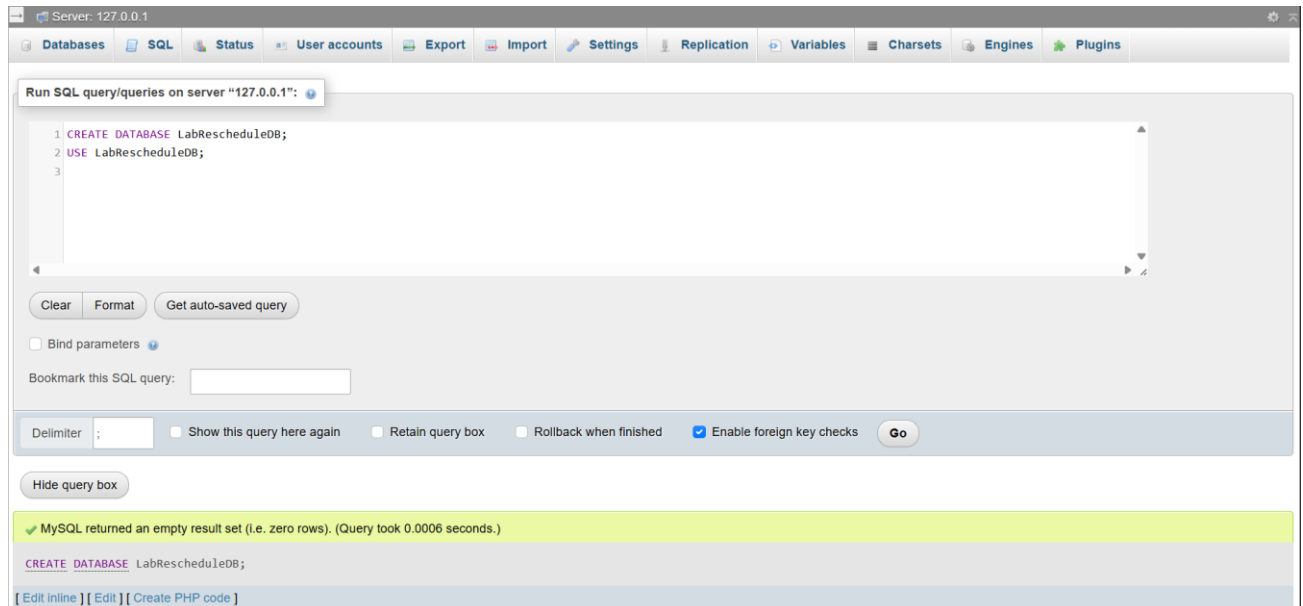


FIGURE 03: QUERY FOR CREATING THE DATABASE

```

2  USE LabRescheduleDB;
3  CREATE TABLE Student (
4      StudentID VARCHAR(10) PRIMARY KEY,
5      Name VARCHAR(100),
6      Email VARCHAR(100),
7      Phone VARCHAR(15)
8  );
9
10 CREATE TABLE SubjectCoordinator (
11     CoordinatorID VARCHAR(10) PRIMARY KEY,
12     Name VARCHAR(100),
13     Email VARCHAR(100),
14     Department VARCHAR(100)
15 );
16
17 CREATE TABLE LabInstructor (
18     InstructorID VARCHAR(10) PRIMARY KEY,
19     Name VARCHAR(100),
20     Email VARCHAR(100),
21     Specialization VARCHAR(100)
22 );
23
24 CREATE TABLE Lab (
25     LabID VARCHAR(10) PRIMARY KEY,
26     LabName VARCHAR(100),
27     Location VARCHAR(100),
28     Capacity INT,
29     Availability BOOLEAN
30 );
31
32 CREATE TABLE LabSchedule (
33     ScheduleID VARCHAR(10) PRIMARY KEY,
34     LabID VARCHAR(10),
35     CoordinatorID VARCHAR(10),
36     Timeslot VARCHAR(20),
37     Date DATE,
38     Status VARCHAR(20),
39     FOREIGN KEY (LabID) REFERENCES Lab(LabID),
40     FOREIGN KEY (CoordinatorID) REFERENCES SubjectCoordinator(CoordinatorID)
41 );
42
43 CREATE TABLE RescheduleRequest (
44     RequestID VARCHAR(10) PRIMARY KEY,
45     StudentID VARCHAR(10),
46     ScheduleID VARCHAR(10),
47     RequestDate DATE,
48     Reason VARCHAR(255),
49     ApprovalLetter BLOB,
50     Status VARCHAR(20),
51     ForwardedToInstructor BOOLEAN,
52     DecisionDate DATE,
53     FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
54     FOREIGN KEY (ScheduleID) REFERENCES LabSchedule(ScheduleID)
55 );
56
57 CREATE TABLE Notification (
58     NotificationID VARCHAR(10) PRIMARY KEY,
59     Message VARCHAR(255),
60     Timestamp DATETIME,
61     Type VARCHAR(20),
62     StudentID VARCHAR(10),
63     CoordinatorID VARCHAR(10),
64     FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
65     FOREIGN KEY (CoordinatorID) REFERENCES SubjectCoordinator(CoordinatorID)
66 );
67
68 CREATE TABLE Attendance (
69     AttendanceID VARCHAR(10) PRIMARY KEY,
70     StudentID VARCHAR(10),
71     ScheduleID VARCHAR(10),
72     Date DATE,
73     Present BOOLEAN,
74     FOREIGN KEY (StudentID) REFERENCES Student(StudentID),
75     FOREIGN KEY (ScheduleID) REFERENCES LabSchedule(ScheduleID)
76 );
77
78 CREATE TABLE RescheduleLog (
79     LogID VARCHAR(10) PRIMARY KEY,
80     RequestID VARCHAR(10),
81     Action VARCHAR(50),
82     Timestamp DATETIME,
83     FOREIGN KEY (RequestID) REFERENCES RescheduleRequest(RequestID)
84 );
85

```

■ Console

FIGURE 04: THE QUERIES FOR CREATING THE TABLES







Run SQL query/queries on database labrescheduledb: ⓘ

```
1 -- Students
2 INSERT INTO Student VALUES ('S001', 'Asha Singh', 'asha@univ.edu', '9876543210');
3 INSERT INTO Student VALUES ('S002', 'Ravi Kumar', 'ravi@univ.edu', '9123456789');
4
5 -- Subject Coordinators
6 INSERT INTO SubjectCoordinator VALUES ('C001', 'Dr. Meera', 'meera@univ.edu', 'Computer Sci');
7
8 -- Lab Instructors
9 INSERT INTO LabInstructor VALUES ('L001', 'Mr. Joseph', 'joseph@univ.edu', 'Networking');
10
11 -- Labs
12 INSERT INTO Lab VALUES ('LB01', 'Computer Lab 1', 'Block A', 30, TRUE);
13
14 -- Lab Schedules
15 INSERT INTO LabSchedule VALUES ('SCH01', 'LB01', 'C001', '10:00-12:00', '2025-06-10', 'Scheduled');
16
17 -- Reschedule Requests
18 -- For ApprovalLetter, use NULL or a dummy value for now (e.g., NULL)
19 INSERT INTO RescheduleRequest VALUES ('RQ001', 'S001', 'SCH01', '2025-06-05', 'Medical reason',
20
21 -- Notifications
22 INSERT INTO Notification VALUES ('N001', 'Your reschedule is approved.', '2025-06-06 09:00:00',
23
24 -- Attendance
25 INSERT INTO Attendance VALUES ('A001', 'S001', 'SCH01', '2025-06-10', TRUE);
26
27 -- Reschedule Log
28 INSERT INTO RescheduleLog VALUES ('LOG01', 'RQ001', 'Submitted', '2025-06-05 08:00:00');
29
```

FIGURE 05: QUERIES FOR ADDING SHOWED DATA IN TO THE DATABASE

AFTER ADDING SAMPLE DATA INTO THE DATABASE TABLES




STUDENTS

<div><div>←T→</div><div></div></div>				StudentID	Name	Email	Phone
<input type="checkbox"/>	 Edit	 Copy	 Delete	S001	Asha Singh	asha@univ.edu	9876543210
<input type="checkbox"/>	 Edit	 Copy	 Delete	S002	Ravi Kumar	ravi@univ.edu	9123456789




SUBJEC TCOORDINATOR

<div><div><div>↔T↔</div><div>▼</div></div></div>				CoordinatorID	Name	Email	Department
<div><div><div><div><div></div></div></div><div><div>✎</div><div>Edit</div></div><div><div>📄</div><div>Copy</div></div><div><div>🗑</div><div>Delete</div></div></div></div> <div>C001</div>	Dr. Meera	meera@univ.edu	Computer Sci				

LAB INSTRUCTORS

<div><div>↩️⤵️</div><div>▼</div></div>				InstructorID	Name	Email	Specialization
<div><div><input type="checkbox"/></div><div> Edit</div><div> Copy</div><div> Delete</div></div>	L001	Mr. Joseph	joseph@univ.edu	Networking			




LABS

		LabID	LabName	Location	Capacity	Availability
<input type="checkbox"/>	 Edit  Copy  Delete	LB01	Computer Lab 1	Block A	30	1




LAB SHEDULES

<div><div><div>←</div><div>T</div><div>→</div></div><div></div></div>				ScheduleID	LabID	CoordinatorID	TimeSlot	Date	Status
<div><div><div><div></div></div></div><div><div><div>Edit</div></div></div><div><div><div>Copy</div></div></div><div><div><div>Delete</div></div></div></div>	SCH01	LB01	C001	10:00-12:00	2025-06-10	Scheduled			

RESCHEDULE REQUESTS

		RequestID	StudentID	ScheduleID	RequestDate	Reason	ApprovalLetter	Status	ForwardedToInstructor	DecisionDate
<input type="checkbox"/>	 Edit  Copy  Delete	RQ001	S001	SCH01	2025-06-05	Medical reason	NULL	Pending	0	NULL

NOTIFICATIONS

				NotificationID	Message	Timestamp	Type	StudentID	CoordinatorID
<input type="checkbox"/>	 Edit	 Copy	 Delete	N001	Your reschedule is approved.	2025-06-06 09:00:00	Email	S001	C001

ATTENDANCE

<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div>				AttendanceID	StudentID	ScheduleID	Date	Present
<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div>	<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div>	<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div>	<div><div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div></div>	A001	S001	SCH01	2025-06-10	1

RESCHEDULE LOG

<div><div><div>↔T↔</div><div>▼</div></div></div>				LogID	RequestID	Action	Timestamp
<div><div><div><div><div></div></div></div><div><div>✎</div><div>Edit</div></div><div><div><div>📄</div><div>Copy</div></div><div><div>🗑</div><div>Delete</div></div></div></div></div>	LOG01	RQ001	Submitted	2025-06-05 08:00:00			

FIGURE 06: TABLE VIEW AFTER ADDING DATA

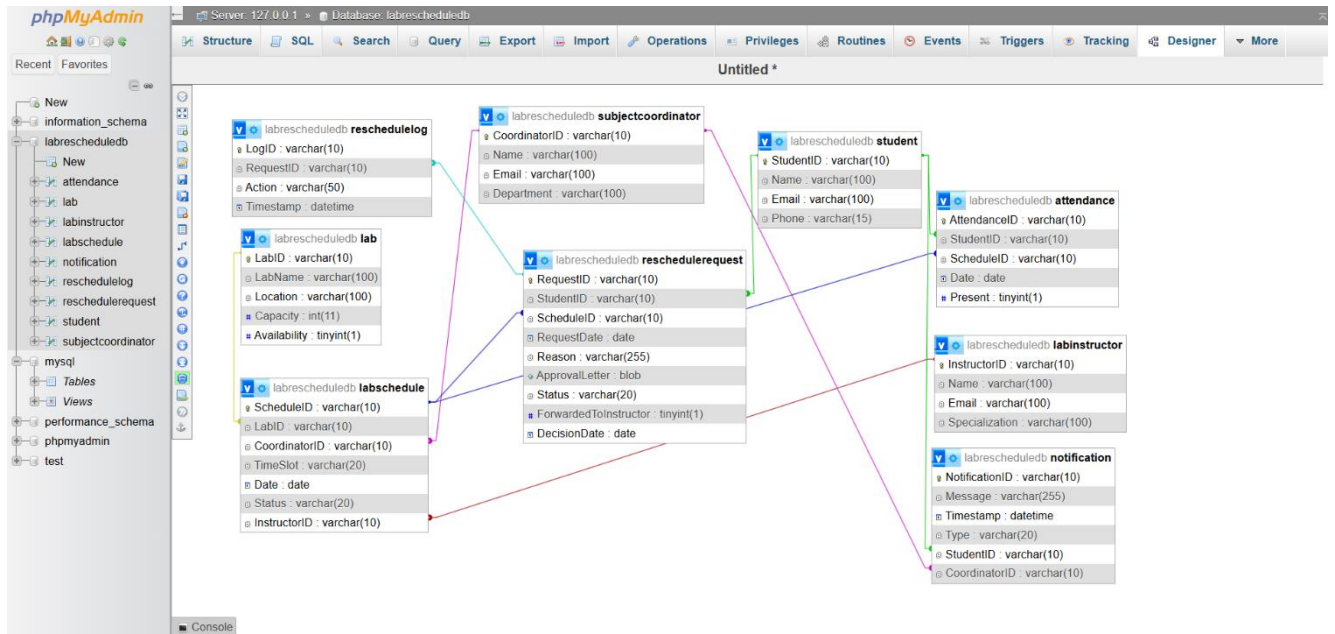


FIGURE 07: DESIGNER VIEW OF THE DATABASE