

Faculty of Arts and Science
Department of Statistics

STAT311
Modern Database Systems

Term Project
“School Management System”

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Introduction

The management of educational purposes is a crucial component for modern academic systems to ensure the organization of students, teachers, courses and other related stuff. The aim of the School Management System is to develop a simple and effective database driven system that meets the following objectives:

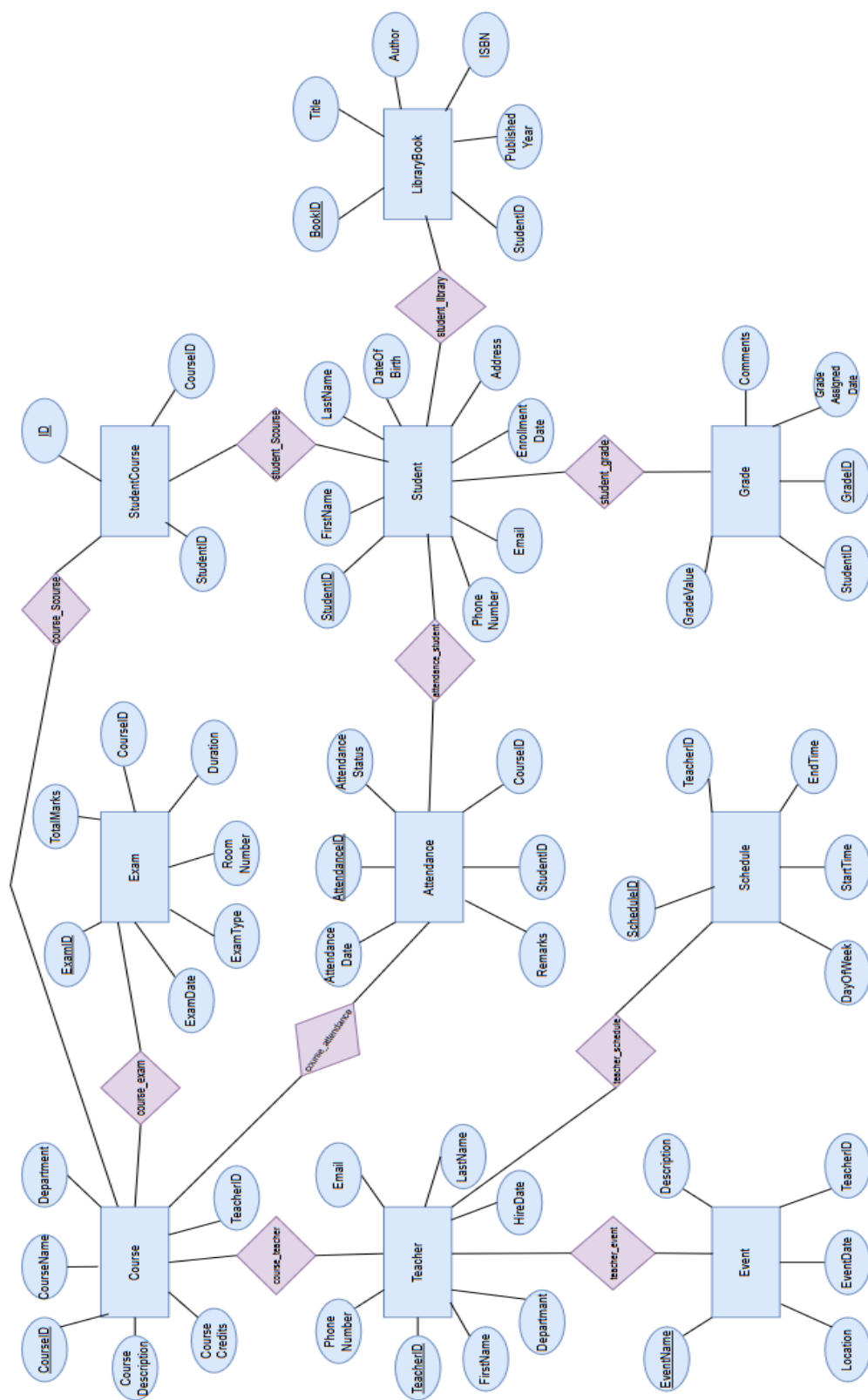
- Effective management of students, teachers, courses and grades
- Attendance records for students in specific courses
- Grade assignments for individual students
- Scheduling and management of exams and events
- Storing detailed records of books

Initially, we designed our project with a user-friendly interface. The initial design consists of two separate screens for students and teachers but since the user interface design is not needed, we removed that part from our project.

Our project is designed under normalization rules. In this project, we developed the database management system with PhpMyAdmin, a web-based tool that simplifies database management. This project demonstrates the core functionality expected from a school management system, providing a foundation for further extension and improvement.

The Student, Teacher and Event tables were created by Bora Esen. The Schedule and LibraryBook tables were created by İren Su Çelik. Emirhan Kıran did the Grade and Exam tables. And lastly, Course and Attendance tables were created by Ata Adanur. The data were prepared by the person who created the tables. The relations were done by all group members together.

ER Diagram



Schema Design

The schema and their properties are developed in the PhpMyAdmin. Let us give the table designs with the properties;

Attendance Schema

#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> 1	AttendanceID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/> 2	AttendanceDate	date			Yes	NULL	
<input type="checkbox"/> 3	AttendanceStatus	enum('Present', 'Absent', 'Late')	utf8_general_ci		Yes	NULL	
<input type="checkbox"/> 4	Remarks	text	utf8_general_ci		Yes	NULL	
<input type="checkbox"/> 5	StudentID	int(11)			Yes	NULL	
<input type="checkbox"/> 6	CourseID	int(11)			Yes	NULL	

AttendanceID is the primary key of this table. AttendanceDate is the date of the corresponding record. AttendanceStatus denotes the status by 3 options, “Present”, “Absent” and “Late”. Remarks is an optional part for denoting the reason of the status. For example, if the status is “Late” for a record, Remarks could be “Traffic issues” or so. StudentID is a foreign key from Student table that indicates the student’s id related with the corresponding record. CourseID is a foreign key from Course table that shows the id of the course for which the attendance record is recorded.

Course Schema

#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> 1	CourseID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/> 2	CourseName	varchar(100)	utf8_general_ci		Yes	NULL	
<input type="checkbox"/> 3	CourseDescription	text	utf8_general_ci		Yes	NULL	
<input type="checkbox"/> 4	CourseCredits	int(11)			Yes	NULL	
<input type="checkbox"/> 5	Department	varchar(50)	utf8_general_ci		Yes	NULL	
<input type="checkbox"/> 6	TeacherID	int(11)			Yes	NULL	

CourseID is the primary key of this table. CourseName is the indicator for the name of the course. CourseDescription is for the detailed description of the course. CourseCredits denotes the credits for the corresponding course. Department entity is used to indicate the department in which course is given under. Lastly, TeacherID is a foreign key for this table which indicates the lecturer’s id. Note that we designed our system as one teacher can give only one course.

Event Schema

	#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/>	1	EventName	varchar(100)	utf8_general_ci		Yes	NULL	
<input type="checkbox"/>	2	Location	varchar(100)	utf8_general_ci		No	None	
<input type="checkbox"/>	3	Description	varchar(500)	utf8_general_ci		No	None	
<input type="checkbox"/>	4	EventDate	date			No	None	
<input type="checkbox"/>	5	TeacherID	int(11)			Yes	NULL	

In this database project, we designed this entity as a weak entity with the ownership of Teacher table. As a result of this, TeacherID was added to the entity as foreign key. EventName is the name of the events. Location denotes where the event will happen. Description is for description of the event. EventDate indicates the date of the event.

Exam Schema

	#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/>	1	ExamID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/>	2	ExamDate	date			No	None	
<input type="checkbox"/>	3	TotalMarks	int(11)			No	None	
<input type="checkbox"/>	4	ExamType	varchar(50)	utf8_general_ci		No	None	
<input type="checkbox"/>	5	RoomNumber	varchar(20)	utf8_general_ci		No	None	
<input type="checkbox"/>	6	Duration	time			No	None	
<input type="checkbox"/>	7	CourseID	int(11)			Yes	NULL	

ExamID is the primary key of this table. ExamDate denotes when the exam is taking place. TotalMarks shows how many points the exam will be evaluated on. ExamType is to denote the exams type. RoomNumber is the place where the exam will be done. Duration is the total time for solving the exam. CourseID is added this table as a foreign key to denote the ID of the course which the exam belongs.

Grade Schema

	#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/>	1	GradeID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/>	2	GradeValue	float			Yes	NULL	
<input type="checkbox"/>	3	Comments	text	utf8_general_ci		Yes	NULL	
<input type="checkbox"/>	4	GradeAssignedDate	date			No	None	
<input type="checkbox"/>	5	StudentID	int(11)			Yes	NULL	

GradeID is the primary key of the Grade table. GradeValue is the overall point average for the corresponding student. Comments are the teacher's comments on the overall point average. GradeAssignedDate is the date when grades are assigned to the corresponding student. Also, StudentID is added this table as foreign key to denote the id of the student.

LibraryBook Schema

#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> 1	BookID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/> 2	Title	varchar(200)	utf8_general_ci		No	None	
<input type="checkbox"/> 3	Author	varchar(100)	utf8_general_ci		No	None	
<input type="checkbox"/> 4	ISBN	varchar(20)	utf8_general_ci		No	None	
<input type="checkbox"/> 5	PublishedYear	year(4)			No	None	
<input type="checkbox"/> 6	StudentID	int(11)			Yes	NULL	

BookID is the primary key of this table. Title denotes the title of the book. Author denotes the author of the book. ISBN is for the International Standard Book Number of the book, and it is unique for this table. PublishedYear is the publication year of the book. Lastly, StudentID is added this table as foreign key to denote the borrower information of the student, if the book is borrowed. If not, the cell remain as null.

Schedule Schema

#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> 1	ScheduleID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/> 2	DayOfWeek	varchar(20)	utf8_general_ci		No	None	
<input type="checkbox"/> 3	StartTime	time			No	None	
<input type="checkbox"/> 4	EndTime	time			No	None	
<input type="checkbox"/> 5	TeacherID	int(11)			Yes	NULL	

ScheduleID is the primary key for this table. DayOfWeek denotes the day of the week when schedule applies. StartTime attribute is for the start time of the scheduled session, and EndTime is for the end time of the scheduled session. TeacherID is the identifier of the teacher for the scheduled session and added this table as the foreign key.

Student Schema

#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/> 1	StudentID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/> 2	FirstName	varchar(50)	utf8_general_ci		No	None	
<input type="checkbox"/> 3	LastName	varchar(50)	utf8_general_ci		No	None	
<input type="checkbox"/> 4	DateOfBirth	date			No	None	
<input type="checkbox"/> 5	Address	varchar(255)	utf8_general_ci		No	None	
<input type="checkbox"/> 6	PhoneNumber	varchar(15)	utf8_general_ci		No	None	
<input type="checkbox"/> 7	Email	varchar(100)	utf8_general_ci		No	None	
<input type="checkbox"/> 8	EnrollmentDate	date			No	None	

StudentID is the primary key for this table. FirstName is the first name of the student. LastName is the last name of the student. DateOfBirth is the birth date of the student. Address attribute is for denoting the address of the student. PhoneNumber is for denoting phone number

of the student, and it is unique. Email attribute denotes email of the student, and it is unique. EnrollmentDate is for the date the student enrolled.

StudentCourse Schema

	#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/>	1	ID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/>	2	StudentID	int(11)			No	None	
<input type="checkbox"/>	3	CourseID	int(11)			No	None	

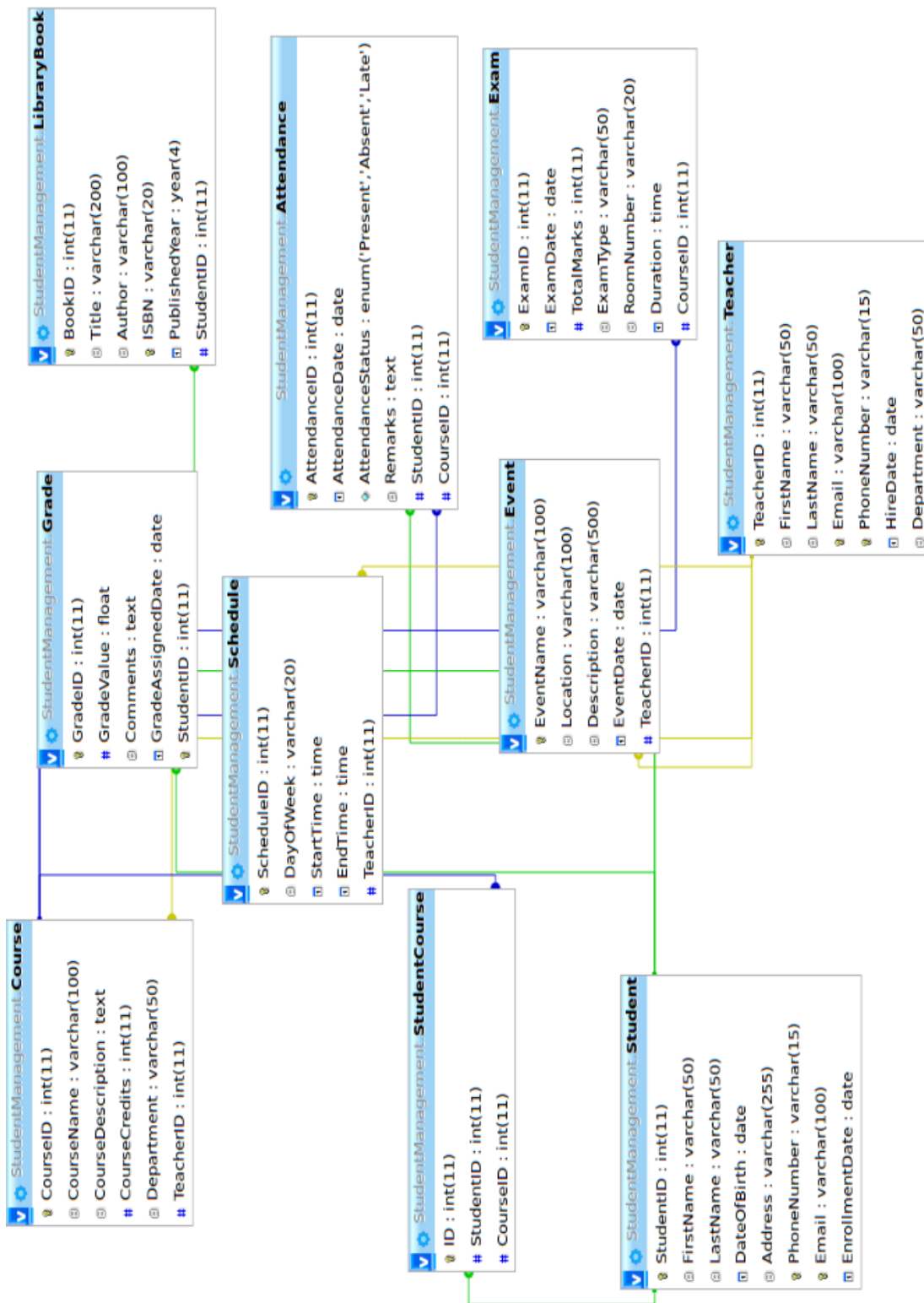
This table is created as a junction table to ensure that a student can take more than one course. ID attribute is created as a primary key to this table. The StudentID is the identifier for the student and CourseID is the identifier for the course. Both of them are set as foreign keys.

Teacher Schema

	#	Name	Type	Collation	Attributes	Null	Default	Extra
<input type="checkbox"/>	1	TeacherID	int(11)			No	None	AUTO_INCREMENT
<input type="checkbox"/>	2	FirstName	varchar(50)	utf8_general_ci		No	None	
<input type="checkbox"/>	3	LastName	varchar(50)	utf8_general_ci		No	None	
<input type="checkbox"/>	4	Email	varchar(100)	utf8_general_ci		No	None	
<input type="checkbox"/>	5	PhoneNumber	varchar(15)	utf8_general_ci		No	None	
<input type="checkbox"/>	6	HireDate	date			No	None	
<input type="checkbox"/>	7	Department	varchar(50)	utf8_general_ci		No	None	

TeacherID is the primary key for this table. FirstName is for first name of the teacher and LastName is the last name of the teacher. Email is for teacher's email, and it is unique. PhoneNumber is for the teacher's phone number, and it is unique. HireDate is the hiring date of the teacher. And lastly, Department is the department that teacher is associated with.

The relational schema is as follows:



Populated Tables

Attendance Table

	AttendanceID	AttendanceDate	AttendanceStatus	Remarks	StudentID	CourseID
<input type="checkbox"/> Edit Copy Delete	2	2024-03-01	Absent	Sick	2	11
<input type="checkbox"/> Edit Copy Delete	3	2024-03-01	Late	Traffic issues	3	8
<input type="checkbox"/> Edit Copy Delete	4	2024-03-02	Present		4	5
<input type="checkbox"/> Edit Copy Delete	5	2024-03-02	Absent	Vacation	5	6
<input type="checkbox"/> Edit Copy Delete	6	2024-03-02	Present		6	6
<input type="checkbox"/> Edit Copy Delete	7	2024-03-03	Late	Missed the bus	7	4
<input type="checkbox"/> Edit Copy Delete	8	2024-03-03	Present		8	3
<input type="checkbox"/> Edit Copy Delete	9	2024-03-04	Absent	Family emergency	9	11
<input type="checkbox"/> Edit Copy Delete	10	2024-03-04	Present		10	2
<input type="checkbox"/> Edit Copy Delete	11	2024-03-01	Present		11	4
<input type="checkbox"/> Edit Copy Delete	12	2024-03-01	Absent	Sick	12	2
<input type="checkbox"/> Edit Copy Delete	13	2024-03-01	Late	Traffic issues	13	1
<input type="checkbox"/> Edit Copy Delete	14	2024-03-02	Present		14	1
<input type="checkbox"/> Edit Copy Delete	15	2024-03-02	Absent	Vacation	15	2
<input type="checkbox"/> Edit Copy Delete	16	2024-03-02	Present		16	10
<input type="checkbox"/> Edit Copy Delete	17	2024-03-03	Late	Missed the bus	17	9
<input type="checkbox"/> Edit Copy Delete	18	2024-03-03	Present		18	8
<input type="checkbox"/> Edit Copy Delete	19	2024-03-04	Absent	Family emergency	19	1
<input type="checkbox"/> Edit Copy Delete	20	2024-03-04	Present		20	6
<input type="checkbox"/> Edit Copy Delete	21	2024-03-04	Late	Missed the bus	21	11

Attendance table consists of 20 entries.

CourseTable

	CourseID	CourseName	CourseDescription	CourseCredits	Department	TeacherID
<input type="checkbox"/> Edit Copy Delete	1	Introduction to Algebra	Basic concepts in algebra, including equations and...	3	Mathematics	1
<input type="checkbox"/> Edit Copy Delete	2	General Physics	An overview of classical mechanics, thermodynamics...	4	Physics	2
<input type="checkbox"/> Edit Copy Delete	3	Organic Chemistry	Fundamentals of organic molecules and reactions.	3	Chemistry	3
<input type="checkbox"/> Edit Copy Delete	4	Human Anatomy	A study of the human body and its systems.	15	Biology	4
<input type="checkbox"/> Edit Copy Delete	5	Data Structures	Introduction to data structures such as arrays, li...	3	Computer Science	10
<input type="checkbox"/> Edit Copy Delete	6	Engineering Dynamics	Study of forces and motion in mechanical systems.	4	Engineering	5
<input type="checkbox"/> Edit Copy Delete	7	World History	A survey of major historical events and eras across...	3	History	8
<input type="checkbox"/> Edit Copy Delete	8	Shakespearean Literature	An in-depth study of the works of Shakespeare and ...	3	Literature	18
<input type="checkbox"/> Edit Copy Delete	9	Advanced Calculus	Differential and integral calculus in multiple dim...	4	Mathematics	6
<input type="checkbox"/> Edit Copy Delete	10	Quantum Mechanics	An introduction to the principles of quantum mecha...	3	Physics	7
<input type="checkbox"/> Edit Copy Delete	11	Environmental Chemistry	Chemistry of environmental systems, pollution, and...	4	Chemistry	9
<input type="checkbox"/> Edit Copy Delete	12	Molecular Biology	Exploration of DNA, RNA, and protein synthesis.	3	Biology	11

Course table consists of 12 entries.

Event Table

EventName	Location	Description	EventDate	TeacherID
Science Fair	Main Auditorium	An exhibiton of science projects and experiments.	2024-03-15	14
Math Olympiad	Lecture Hall A	A competitive math event for advanced problem solv...	2024-04-10	6
Coding Hackathon	Computer Lab 1	A 24-hour programming competition.	2024-05-25	10
Literature Reading	Library Conference Room	A literary event featuring readings and discussion...	2024-06-12	18
Physics Workshop	Engineering Workshop Room	A practical session on physics experiments.	2024-07-20	21
AI Workshop	Computer Science Lab	Hands-on workshop on AI basics.	2024-12-30	1

Event table consists of 6 entries.

Exam Table

ExamID	ExamDate	TotalMarks	ExamType	RoomNumber	Duration	CourseID
41	2024-03-01	100	Midterm	R101	02:00:00	1
42	2024-03-15	100	Final	R102	03:00:00	1
43	2024-04-10	50	Quiz	R201	01:00:00	9
44	2024-04-25	70	Assignment	R202	01:30:00	3
45	2024-05-05	80	Midterm	R103	02:30:00	12
46	2024-05-20	100	Final	R104	03:00:00	4
47	2024-06-01	30	Class Test	R301	00:45:00	7
48	2024-06-15	60	Project	R302	01:45:00	2
49	2024-07-05	50	Midterm	R401	02:00:00	8
50	2024-07-20	100	Final	R402	03:00:00	6
51	2024-08-01	20	Quiz	R501	00:30:00	9
52	2024-08-10	80	Assignment	R502	01:30:00	3
53	2024-09-05	75	Midterm	R601	02:15:00	8
54	2024-09-20	100	Final	R602	03:00:00	6
55	2024-10-01	40	Class Test	R701	01:00:00	7
56	2024-10-15	60	Project	R702	01:30:00	2
57	2024-11-01	90	Midterm	R801	02:30:00	12
58	2024-11-20	100	Final	R802	03:00:00	6
59	2024-12-05	25	Quiz	R901	00:45:00	9
60	2024-12-15	50	Assignment	R902	01:00:00	3

Exam table consist of 20 entries.

Grade Table

 		GradeID	GradeValue	Comments	GradeAssignedDate	StudentID
<input type="checkbox"/>	 Edit  Copy  Delete	2	2.58	Good effort.	2024-03-05	2
<input type="checkbox"/>	 Edit  Copy  Delete	3	2.2	Satisfactory performance.	2024-03-10	3
<input type="checkbox"/>	 Edit  Copy  Delete	4	2.02	Needs improvement.	2024-03-15	4
<input type="checkbox"/>	 Edit  Copy  Delete	5	1.72	Failed the term.	2024-03-20	5
<input type="checkbox"/>	 Edit  Copy  Delete	6	4	Outstanding understanding of the material.	2024-04-01	6
<input type="checkbox"/>	 Edit  Copy  Delete	7	2.65	Above average work.	2024-04-05	7
<input type="checkbox"/>	 Edit  Copy  Delete	8	2.5	Met the basic requirements.	2024-04-10	8
<input type="checkbox"/>	 Edit  Copy  Delete	9	2.32	Struggled with the material.	2024-04-15	9
<input type="checkbox"/>	 Edit  Copy  Delete	10	1.97	Did not meet minimum requirements.	2024-04-20	10
<input type="checkbox"/>	 Edit  Copy  Delete	11	3.72	Demonstrated exceptional skills.	2024-05-01	11
<input type="checkbox"/>	 Edit  Copy  Delete	12	2.98	Well-done.	2024-05-10	12
<input type="checkbox"/>	 Edit  Copy  Delete	13	2.52	Satisfactory understanding.	2024-05-15	13
<input type="checkbox"/>	 Edit  Copy  Delete	14	2.12	Lacked critical skills.	2024-05-20	14
<input type="checkbox"/>	 Edit  Copy  Delete	15	2.01	Incomplete understanding.	2024-05-25	15
<input type="checkbox"/>	 Edit  Copy  Delete	16	3.85	Perfect score.	2024-06-01	16
<input type="checkbox"/>	 Edit  Copy  Delete	17	3.43	Strong performance.	2024-06-10	17
<input type="checkbox"/>	 Edit  Copy  Delete	18	2.51	Average results.	2024-06-15	18
<input type="checkbox"/>	 Edit  Copy  Delete	19	2.25	Below expectations.	2024-06-20	19
<input type="checkbox"/>	 Edit  Copy  Delete	20	2	Insufficient effort.	2024-06-25	20
<input type="checkbox"/>	 Edit  Copy  Delete	21	3.89	Exemplary work.	2024-07-01	21

Grade table consists of 20 entries.

LibraryBook Table

	BookID	Title	Author	ISBN	PublishedYear	StudentID
<input type="checkbox"/> Edit Copy Delete	1	Introduction to Algorithms	Thomas H. Cormen	978-0262033848	2009	2
<input type="checkbox"/> Edit Copy Delete	2	The Art of Computer Programming	Donald E. Knuth	978-0201896831	2011	2
<input type="checkbox"/> Edit Copy Delete	3	Clean Code	Robert C. Martin	978-0132350884	2008	NULL
<input type="checkbox"/> Edit Copy Delete	4	Design Patterns	Erich Gamma	978-0201633610	1994	NULL
<input type="checkbox"/> Edit Copy Delete	5	Artificial Intelligence: A Modern Approach	Stuart Russell	978-0136042594	2010	5
<input type="checkbox"/> Edit Copy Delete	6	Data Science for Business	Foster Provost	978-1449361327	2013	NULL
<input type="checkbox"/> Edit Copy Delete	7	Python Crash Course	Eric Matthes	978-1593279288	2019	8
<input type="checkbox"/> Edit Copy Delete	8	JavaScript: The Good Parts	Douglas Crockford	978-0596517748	2008	NULL
<input type="checkbox"/> Edit Copy Delete	9	The Pragmatic Programmer	Andy Hunt	978-0201616224	1999	NULL
<input type="checkbox"/> Edit Copy Delete	10	You Don't Know JS	Kyle Simpson	978-1491904244	2015	NULL
<input type="checkbox"/> Edit Copy Delete	11	Introduction to Quantum Mechanics	David J. Griffiths	978-1107189638	2018	21
<input type="checkbox"/> Edit Copy Delete	12	Linear Algebra Done Right	Sheldon Axler	978-3319110790	2015	NULL
<input type="checkbox"/> Edit Copy Delete	13	Chemistry: The Central Science	Theodore L. Brown	978-0134414232	2017	12
<input type="checkbox"/> Edit Copy Delete	14	Biology	Neil A. Campbell	978-0134093413	2017	NULL
<input type="checkbox"/> Edit Copy Delete	15	Principles of Economics	N. Gregory Mankiw	978-1305585126	2017	9
<input type="checkbox"/> Edit Copy Delete	16	World History	William J. Duiker	978-0357026862	2018	NULL
<input type="checkbox"/> Edit Copy Delete	17	Physics for Scientists and Engineers	Douglas C. Giancoli	978-0321964670	2015	14
<input type="checkbox"/> Edit Copy Delete	18	Discrete Mathematics and Its Applications	Kenneth H. Rosen	978-0073383095	2018	NULL
<input type="checkbox"/> Edit Copy Delete	19	Operating System Concepts	Abraham Silberschatz	978-1118063330	2013	9
<input type="checkbox"/> Edit Copy Delete	20	Database System Concepts	Abraham Silberschatz	978-0078022159	2010	NULL
<input type="checkbox"/> Edit Copy Delete	21	Introduction to Game Design	Jesse Schell	978-1491927457	2015	12
<input type="checkbox"/> Edit Copy Delete	22	Computer Networking: A Top-Down Approach	James F. Kurose	978-0133594140	2017	NULL
<input type="checkbox"/> Edit Copy Delete	23	Deep Learning	Ian Goodfellow	978-0262035613	2016	NULL
<input type="checkbox"/> Edit Copy Delete	24	Principles of Neural Science	Eric R. Kandel	978-0071390118	2012	NULL
<input type="checkbox"/> Edit Copy Delete	25	The Great Gatsby	F. Scott Fitzgerald	978-0743273565	1925	NULL

LibraryBook table consists of 30 entries.

Schedule Table

	ScheduleID	DayOfWeek	StartTime	EndTime	TeacherID
<input type="checkbox"/> Edit Copy Delete	1	Monday	09:00:00	11:00:00	3
<input type="checkbox"/> Edit Copy Delete	2	Tuesday	10:00:00	12:00:00	5
<input type="checkbox"/> Edit Copy Delete	3	Wednesday	13:00:00	15:00:00	7
<input type="checkbox"/> Edit Copy Delete	4	Thursday	08:00:00	10:00:00	2
<input type="checkbox"/> Edit Copy Delete	5	Friday	14:00:00	16:00:00	6
<input type="checkbox"/> Edit Copy Delete	6	Monday	11:00:00	13:00:00	8
<input type="checkbox"/> Edit Copy Delete	7	Tuesday	15:00:00	17:00:00	9
<input type="checkbox"/> Edit Copy Delete	8	Wednesday	09:00:00	11:00:00	11
<input type="checkbox"/> Edit Copy Delete	9	Thursday	10:00:00	12:00:00	15
<input type="checkbox"/> Edit Copy Delete	10	Friday	16:00:00	18:00:00	16
<input type="checkbox"/> Edit Copy Delete	11	Saturday	08:30:00	10:30:00	13
<input type="checkbox"/> Edit Copy Delete	12	Sunday	12:00:00	14:00:00	12

Schedule table consists of 12 entries.

Student Table

	StudentID	FirstName	LastName	DateOfBirth	Address	PhoneNumber	Email	EnrollmentDate
<input type="checkbox"/> Edit Copy Delete	2	Bella	Rodriguez	2001-02-10	102 Orange St	5558765432	bella.rodriguez@example.com	2021-09-20
<input type="checkbox"/> Edit Copy Delete	3	Caleb	Parker	1999-03-15	103 Pear St	5557654323	caleb.parker@example.com	2020-07-01
<input type="checkbox"/> Edit Copy Delete	4	Diana	Bailey	2002-04-25	104 Cherry St	5556543214	diana.bailey@example.com	2023-01-10
<input type="checkbox"/> Edit Copy Delete	5	Elijah	Collins	1998-05-12	105 Plum St	5555432105	elijah.collins@example.com	2019-09-30
<input type="checkbox"/> Edit Copy Delete	6	Fiona	Brooks	2001-06-17	106 Peach St	5554321096	fiona.brooks@example.com	2021-03-15
<input type="checkbox"/> Edit Copy Delete	7	George	Murphy	2000-07-20	107 Pine St	5553210987	george.murphy@example.com	2020-08-22
<input type="checkbox"/> Edit Copy Delete	8	Hannah	Price	1999-08-05	108 Walnut St	5552109878	hannah.price@example.com	2019-07-25
<input type="checkbox"/> Edit Copy Delete	9	Isaac	Gray	2002-09-14	109 Maple St	5551098769	isaac.gray@example.com	2023-02-14
<input type="checkbox"/> Edit Copy Delete	10	Julia	Reed	2001-10-03	110 Oak St	5550987650	julia.reed@example.com	2022-09-15
<input type="checkbox"/> Edit Copy Delete	11	Kevin	Jenkins	2000-11-18	111 Elm St	5559876542	kevin.jenkins@example.com	2020-01-12
<input type="checkbox"/> Edit Copy Delete	12	Luna	Watson	2002-12-27	112 Spruce St	5558765433	luna.watson@example.com	2023-01-18
<input type="checkbox"/> Edit Copy Delete	13	Mason	Sanders	2000-03-22	113 Cedar St	5557654324	mason.sanders@example.com	2020-08-08
<input type="checkbox"/> Edit Copy Delete	14	Nora	Foster	1999-01-10	114 Willow St	5556543215	nora.foster@example.com	2019-07-10
<input type="checkbox"/> Edit Copy Delete	15	Owen	Powell	2001-02-14	115 Birch St	5555432106	owen.powell@example.com	2021-03-20
<input type="checkbox"/> Edit Copy Delete	16	Paige	Cruz	1998-04-25	116 Ash St	5554321097	paige.cruz@example.com	2018-09-01
<input type="checkbox"/> Edit Copy Delete	17	Quincy	Morgan	2000-06-17	117 Redwood St	5553210988	quincy.morgan@example.com	2022-06-10
<input type="checkbox"/> Edit Copy Delete	18	Ruby	Hayes	2001-08-30	118 Sycamore St	5552109879	ruby.hayes@example.com	2021-01-15
<input type="checkbox"/> Edit Copy Delete	19	Sean	Cunningham	1999-10-20	119 Poplar St	5551098760	sean.cunningham@example.com	2019-09-01
<input type="checkbox"/> Edit Copy Delete	20	Tina	Mendoza	2002-11-05	120 Chestnut St	5550987651	tina.mendoza@example.com	2023-03-01
<input type="checkbox"/> Edit Copy Delete	21	Victor	Knight	2000-12-19	121 Fir St	5559876543	victor.knight@example.com	2020-05-25

Student table consists of 20 entries

StudentCourse Table

	ID	StudentID	CourseID
<input type="checkbox"/> Edit Copy Delete	1	13	1
<input type="checkbox"/> Edit Copy Delete	2	14	1
<input type="checkbox"/> Edit Copy Delete	3	19	1
<input type="checkbox"/> Edit Copy Delete	4	10	2
<input type="checkbox"/> Edit Copy Delete	5	12	2
<input type="checkbox"/> Edit Copy Delete	6	15	2
<input type="checkbox"/> Edit Copy Delete	7	8	3
<input type="checkbox"/> Edit Copy Delete	8	2	4
<input type="checkbox"/> Edit Copy Delete	9	7	4
<input type="checkbox"/> Edit Copy Delete	10	11	4
<input type="checkbox"/> Edit Copy Delete	11	4	5
<input type="checkbox"/> Edit Copy Delete	12	5	6
<input type="checkbox"/> Edit Copy Delete	13	6	6
<input type="checkbox"/> Edit Copy Delete	14	20	6
<input type="checkbox"/> Edit Copy Delete	15	3	8
<input type="checkbox"/> Edit Copy Delete	16	18	8
<input type="checkbox"/> Edit Copy Delete	17	17	9
<input type="checkbox"/> Edit Copy Delete	18	16	10
<input type="checkbox"/> Edit Copy Delete	19	2	11
<input type="checkbox"/> Edit Copy Delete	20	9	11
<input type="checkbox"/> Edit Copy Delete	21	21	11

StudentCourse table consists of 20 entries.

Teacher Table

	TeacherID	FirstName	LastName	Email	PhoneNumber	HireDate	Department
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	1	Alice	Williams	alice.williams@example.com	5551234561	2020-05-01	Mathematics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Bob	Johnson	bob.johnson@example.com	5552345672	2019-06-10	Physics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Carol	Davis	carol.davis@example.com	5553456783	2018-07-20	Chemistry
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	David	Clark	david.clark@example.com	5554567894	2021-08-15	Biology
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	Eve	Walker	eve.walker@example.com	5555678905	2017-09-30	Engineering
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	6	Frank	Lopez	frank.lopez@example.com	5556789016	2023-01-05	Mathematics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	7	Grace	Harris	grace.harris@example.com	5557890127	2022-02-14	Physics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	8	Hank	Martinez	hank.martinez@example.com	5558901238	2016-03-25	Literature
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	9	Ivy	Robinson	ivy.robinson@example.com	5559012349	2015-04-18	Chemistry
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	10	Jack	Lewis	jack.lewis@example.com	5550123450	2014-05-22	Computer Science
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	11	Kim	Lee	kim.lee@example.com	5551234560	2013-06-05	Biology
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	12	Leo	Walker	leo.walker@example.com	5552345671	2021-07-11	Engineering
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	13	Mia	Scott	mia.scott@example.com	5553456782	2018-08-17	Mathematics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	14	Nina	Adams	nina.adams@example.com	5554567893	2017-09-25	Physics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	15	Owen	Campbell	owen.campbell@example.com	5555678904	2016-10-13	Chemistry
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	16	Paul	Mitchell	paul.mitchell@example.com	5556789015	2015-11-20	Biology
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	17	Quinn	Perez	quinn.perez@example.com	5557890126	2019-12-08	Engineering
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	18	Ruby	Hughes	ruby.hughes@example.com	5558901237	2020-01-19	Literature
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	19	Sam	Morris	sam.morris@example.com	5559012348	2021-02-27	Computer Science
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	20	Tina	Foster	tina.foster@example.com	5550123459	2023-03-09	Mathematics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	21	Uma	Sanders	uma.sanders@example.com	5551234568	2022-04-16	Physics
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	22	Victor	Ramirez	victor.ramirez@example.com	5552345679	2019-05-21	Chemistry
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	23	Wendy	Carter	wendy.carter@example.com	5553456780	2018-06-18	Biology
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	24	Xavier	Nelson	xavier.nelson@example.com	5554567891	2020-07-24	Engineering

Teacher table consists of 24 entries.

Summary

Our School Management System displays basic functionality of a school management system with 10 tables: Attendance, Course, Event, Exam, Grade, LibraryBook, Schedule, Student, StudentCourse and Teacher. This database-driven system achieves efficient management of students, teachers, courses and grades, also achieves simplified attendance and library book tracking. Moreover, our system manages schedules of the courses, exams and events. StudentCourse table allows students to enroll in more than one course.

Some Example Queries

Queries were done by using terminal. The database is connected to the terminal via Python by using pymysql library. We had some difficulties in connecting the database to the terminal, but

we've solved it by installing SSL to the virtual computer. Team members have created 4 queries per person. The resulting 16 SQL queries and their results are shown below as screenshots of terminal. These queries were designed to test the CRUD functionality of the project. The query files could be seen in the zip file.

1)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 INSERT INTO Student (FirstName, LastName, DateOfBirth, Address, PhoneNumber, Email,
11 EnrollmentDate)
12 VALUES ('Ethan', 'Clark', '2002-05-30', '456 Elm St', '5551239876', 'ethan.clark@example.com',
13 '2024-09-01')
14 """)
15
16 connection.commit()
17 print("Student record created successfully")
18
19 connection.close()
```

```
student@student:~/Desktop$ python3 query1.py
Connection Established
Student record created successfully
```

2)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 INSERT INTO Teacher (FirstName, LastName, Email, PhoneNumber, HireDate, Department)
11 VALUES ('Emma', 'Johnson', 'emma.johnson@example.com', '5557891234', '2023-01-15',
12 'Mathematics')
13 """)
14
15 connection.commit()
16 print("Teacher record created successfully")
17
18 connection.close()
```

```
student@student:~/Desktop$ python3 query2.py
Connection Established
Teacher record created successfully
```


3)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 INSERT INTO Course (CourseName, CourseDescription, CourseCredits, Department, TeacherID)
11 VALUES ('Introduction to Python', 'Basics of Python programming', 3, 'Computer Science', 4)
12 """)
13 connection.commit()
14 print("Course record created successfully")
15
16 connection.close()
```

```
student@student:~/Desktop$ python3 query3.py
Connection Established
Course record created successfully
```

4)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 INSERT INTO LibraryBook (Title, Author, ISBN, PublishedYear, StudentID)
11 VALUES ('Introduction to AI', 'John Doe', '978-1234567890', 2021, 2)
12 """)
13 connection.commit()
14 print("Library book record created successfully")
15
16 connection.close()
```

```
student@student:~/Desktop$ python3 query4.py
Connection Established
Library book record created successfully
```

5)

```

1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_", database="SchoolManagement")
4 cursor = connection.cursor()
5
6 print("Connection Established")
7 # Query to retrieve schedule details
8 query = """
9 SELECT
10     Teacher.TeacherID,
11     CONCAT(Teacher.FirstName, ' ', Teacher.LastName) AS TeacherName,
12     Teacher.Department,
13     Schedule.DayOfWeek,
14     Schedule.StartTime,
15     Schedule.EndTime
16 FROM
17     Teacher
18 INNER JOIN
19     Schedule ON Teacher.TeacherID = Schedule.TeacherID
20 ORDER BY
21     Schedule.DayOfWeek, Schedule.StartTime;
22 """
23
24 cursor.execute(query)
25
26 # Fetching and printing the results
27 myresult = cursor.fetchall()
28 for x in myresult:
29     print(x)
30
31 # Closing the connection
32 connection.close()

```

```

student@student:~$ cd Desktop
student@student:~/Desktop$ python3 query5.py
Connection Established
(6, 'Frank Lopez', 'Mathematics', 'Friday', datetime.timedelta(seconds=50400), datetime.timedelta(seconds=57600))
(16, 'Paul Mitchell', 'Biology', 'Friday', datetime.timedelta(seconds=57600), datetime.timedelta(seconds=64800))
(8, 'Hank Martinez', 'Literature', 'Monday', datetime.timedelta(seconds=39600), datetime.timedelta(seconds=46800))
(13, 'Mia Scott', 'Mathematics', 'Saturday', datetime.timedelta(seconds=30600), datetime.timedelta(seconds=37800))
(12, 'Leo Walker', 'Engineering', 'Sunday', datetime.timedelta(seconds=43200), datetime.timedelta(seconds=50400))
(2, 'Bob Johnson', 'Physics', 'Thursday', datetime.timedelta(seconds=28800), datetime.timedelta(seconds=36000))
(15, 'Owen Campbell', 'Chemistry', 'Thursday', datetime.timedelta(seconds=36000), datetime.timedelta(seconds=43200))
(5, 'Eve Walker', 'Chemistry', 'Tuesday', datetime.timedelta(seconds=36000), datetime.timedelta(seconds=43200))
(9, 'Ivy Robinson', 'Chemistry', 'Tuesday', datetime.timedelta(seconds=54000), datetime.timedelta(seconds=61200))
(11, 'Kim Lee', 'Biology', 'Wednesday', datetime.timedelta(seconds=32400), datetime.timedelta(seconds=39600))
(7, 'Grace Harris', 'Physics', 'Wednesday', datetime.timedelta(seconds=46800), datetime.timedelta(seconds=54000))

```

6)

```

1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23StudentT47_", database="SchoolManagement")
4 cursor = connection.cursor()
5
6 print("Connection Established")
7
8 # Query to retrieve exam details
9 query = """
10 SELECT
11     Exam.ExamID,
12     Course.CourseName,
13     Exam.ExamType,
14     Exam.TotalMarks,
15     Exam.ExamDate,
16     Exam.RoomNumber
17 FROM
18     Exam
19 INNER JOIN
20     Course ON Exam.CourseID = Course.CourseID
21 ORDER BY
22     Exam.ExamDate;
23 """
24
25 cursor.execute(query)
26
27 # Fetching and printing the results
28 myresult = cursor.fetchall()
29 for x in myresult:
30     print(x)
31
32 # Closing the connection
33 connection.close()

```

```

student@student:~/Desktop$ python3 query6.py
Connection Established
(41, 'Introduction to Algebra', 'Midterm', 100, datetime.date(2024, 3, 1), 'R101')
(42, 'Introduction to Algebra', 'Final', 100, datetime.date(2024, 3, 15), 'R102')
(43, 'Advanced Calculus', 'Quiz', 50, datetime.date(2024, 4, 10), 'R201')
(44, 'Organic Chemistry', 'Assignment', 70, datetime.date(2024, 4, 25), 'R202')
(45, 'Molecular Biology', 'Midterm', 80, datetime.date(2024, 5, 5), 'R103')
(46, 'Human Anatomy', 'Final', 100, datetime.date(2024, 5, 20), 'R104')
(47, 'World History', 'Class Test', 30, datetime.date(2024, 6, 1), 'R301')
(48, 'General Physics', 'Project', 60, datetime.date(2024, 6, 15), 'R302')
(49, 'Shakespearean Literature', 'Midterm', 50, datetime.date(2024, 7, 5), 'R401')
(50, 'Engineering Dynamics', 'Final', 100, datetime.date(2024, 7, 20), 'R402')
(51, 'Advanced Calculus', 'Quiz', 20, datetime.date(2024, 8, 1), 'R501')
(52, 'Organic Chemistry', 'Assignment', 80, datetime.date(2024, 8, 10), 'R502')
(53, 'Shakespearean Literature', 'Midterm', 75, datetime.date(2024, 9, 5), 'R601')
(54, 'Engineering Dynamics', 'Final', 100, datetime.date(2024, 9, 20), 'R602')
(55, 'World History', 'Class Test', 40, datetime.date(2024, 10, 1), 'R701')
(56, 'General Physics', 'Project', 60, datetime.date(2024, 10, 15), 'R702')
(57, 'Molecular Biology', 'Midterm', 90, datetime.date(2024, 11, 1), 'R801')
(58, 'Engineering Dynamics', 'Final', 100, datetime.date(2024, 11, 20), 'R802')
(59, 'Advanced Calculus', 'Quiz', 25, datetime.date(2024, 12, 5), 'R901')
(60, 'Organic Chemistry', 'Assignment', 50, datetime.date(2024, 12, 15), 'R902')

```


7)

```

1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("SELECT * FROM Event WHERE EventDate BETWEEN '2024-01-01' AND '2025-01-01'")
10 myresult = cursor.fetchall()
11 for x in myresult:
12     print(x)
13
14 connection.close()

```

```

student@student:~/Desktop$ python3 query7.py
Connection Established
('Science Fair', 'Main Auditorium', 'An exhibiton of science projects\r\nand experiments.', datetime.date(2024, 3, 15), 14)
('Math Olympiad', 'Lecture Hall A', 'A competitive math event for\r\nadvanced problem solving.', datetime.date(2024, 4, 10), 6)
('Coding Hackathon', 'Computer Lab 1', 'A 24-hour programming\r\ncompetition.', datetime.date(2024, 5, 25), 10)
('Literature Reading', 'Library Conference Room', 'A literary event\r\nfeaturing readings and discussions.', datetime.date(2024, 6, 12), 18)
('Physics Workshop', 'Engineering Workshop Room', 'A practical session\r\non physics experiments.', datetime.date(2024, 7, 20), 21)
('AI Workshop', 'Computer Science Lab', 'Hands-on workshop on AI\r\nbasics.', datetime.date(2024, 12, 30), 1)

```

8)

```

1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("SELECT * FROM Attendance WHERE AttendanceStatus='Absent'")
10 myresult = cursor.fetchall()
11 for x in myresult:
12     print(x)
13
14 connection.close()

```

```

student@student:~/Desktop$ python3 query8.py
Connection Established
(2, datetime.date(2024, 3, 1), 'Absent', 'Sick', 2, 11)
(5, datetime.date(2024, 3, 2), 'Absent', 'Vacation', 5, 6)
(9, datetime.date(2024, 3, 4), 'Absent', 'Family emergency', 9, 11)
(12, datetime.date(2024, 3, 1), 'Absent', 'Sick', 12, 2)
(15, datetime.date(2024, 3, 2), 'Absent', 'Vacation', 15, 2)
(19, datetime.date(2024, 3, 4), 'Absent', 'Family emergency', 19, 1)

```

9)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 UPDATE Student
11 SET Address='789 Pine St', PhoneNumber='111222333'
12 WHERE StudentID=3
13 """)
14 connection.commit()
15 print("Student record updated successfully")
16
17 connection.close()
```

```
student@student:~/Desktop$ python3 query9.py
Connection Established
Student record updated successfully
```

10)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 UPDATE Teacher
11 SET Department='Chemistry'
12 WHERE TeacherID=5
13 """)
14 connection.commit()
15 print("Teacher record updated successfully")
16
17 connection.close()
```

```
student@student:~/Desktop$ python3 query10.py
Connection Established
Teacher record updated successfully
```

11)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 UPDATE LibraryBook
11 SET Title='Advanced AI Concepts'
12 WHERE BookID=1
13 """)
14 connection.commit()
15 print("Library book record updated successfully")
16
17 connection.close()
```

```
student@student:~/Desktop$ python3 query11.py
Connection Established
Library book record updated successfully
```

12)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("""
10 UPDATE Event
11 SET Location='Conference Room A'
12 WHERE EventName='Science Fair'
13 """)
14 connection.commit()
15 print("Event updated successfully")
16
17 connection.close()
```

```
student@student:~/Desktop$ python3 query12.py
Connection Established
Event updated successfully
```

13)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("DELETE FROM Student WHERE StudentID=4")
10
11 connection.commit()
12 print("Student record deleted successfully")
13
14 connection.close()
```

```
student@student:~/Desktop$ python3 query13.py
Connection Established
Student record deleted successfully
```

14)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("DELETE FROM Teacher WHERE TeacherID=3")
10
11 connection.commit()
12 print("Teacher record deleted successfully")
13
14 connection.close()
```

```
student@student:~/Desktop$ python3 query14.py
Connection Established
Teacher record deleted successfully
```


15)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("DELETE FROM Attendance WHERE AttendanceID=2")
10
11 connection.commit()
12 print("Attendance record deleted successfully")
13
14 connection.close()
```

```
student@student:~/Desktop$ python3 query15.py
Connection Established
Attendance record deleted successfully
```

16)

```
1 import pymysql
2
3 connection = pymysql.connect(host="localhost", port=3306, user="root", passwd="_23Student47_",
4 database="SchoolManagement")
5 cursor = connection.cursor()
6
7 print("Connection Established")
8
9 cursor.execute("DELETE FROM LibraryBook WHERE BookID=3")
10
11 connection.commit()
12 print("Library book record deleted successfully")
13
14 connection.close()
```

```
student@student:~/Desktop$ python3 query16.py
Connection Established
Library book record deleted successfully
```