

Introduction to Smooth Driving

College of Motoring

CS457(A) - Data Modeling and Implementation Techniques

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March 17, 2024

Scenario

The Smooth Drive College of Motoring was established in Glasgow in 1992. Since then, the school has grown steadily and now has several offices in most of the main cities of Scotland. However, the school is now so large that more and more administrative staff are being employed to cope with the ever-increasing amount of paperwork.

Furthermore, the communication and sharing of information between offices, even in the same city, is poor. The Director of the school, Dave MacLeod, feels that too many mistakes are being made and that the success of the school will be short-lived if he does not do something to remedy the situation. He knows that a database could help in part to solve the problem and has approached you and your team to help in creating a database system to support the running of the EasyDrive School of Motoring. The Director has provided the following brief description of how the Smooth Drive College of Motoring operates.

B.2.1 Data Requirements

Each office has a Manager (who tends to also be a Senior Instructor), several Senior Instructors, Instructors, and administrative staff. The Manager is responsible for the day-to-day running of the office. Clients must first register at an office, which includes completion of an application form, which records their personal details. Before the first lesson, a client is requested to attend an interview with an Instructor to assess the needs of the client and to ensure that the client holds a valid provisional driving license.

A client is free to ask for a particular Instructor or to request that an Instructor be changed at any stage throughout the process of learning to drive. After the interview, the first lesson is booked. A client may request individual lessons or book a block of lessons for a reduced fee. An individual lesson is for one hour, which begins and ends at the office. A lesson is with a particular Instructor in a particular car at a given time. Lessons can start as early as 8:00 a.m. and as late as 8:00 p.m. After each lesson, the Instructor records the progress made by the client and notes the mileage used during the lesson. The school has a pool of cars, which are adapted for the purposes of teaching. Each Instructor is allocated to a particular car. As well as teaching, the Instructors are free to use the cars for personal use. The cars are inspected at regular intervals for faults. Once ready, a client applies for a driving test date. To obtain a full driving license, the client must pass both the driving and written parts of the test. It is the responsibility of the Instructor to ensure that the client is best prepared for all aspects of the test. The Instructor is not responsible for testing the client and is not in the car during the test, but should be available to drop off and pick up the client before and after the test at the Testing Center. If a client fails to pass, the Instructor must record the reasons for the failure.

Research and identify the common operations eg. Data Entry ,Data update or deletion operations ,List the problems that need to be addressed.

Abstract

The driving school is the main source of information about road safety and imparts practical driving skills, thus giving proper preparation of people that are going to take the responsibility of the road. This kind of establishment also needs to be organized adequately, has a schedule, and offers small groups to ensure that students are well trained and prepared for work. To acknowledge the intricate nature of such undertakings, this project presents a cutting-edge database system which was carefully developed for the specific genesis of driving schools.

Adopting a pilot design approach which focuses on documents and graphical representations, we intend to obtain and group data that would represent the vast interactions at a driving school. In this line, it is possible to acquire exact student registrations, qualifications of instructors, vehicle statuses and all course details which are fundamental for smooth running of routine day-to-day work. On the other hand, this data will also benefit the administrators from the generated reports to enable them to take strategic decisions and students and teachers by giving them the information they need.

This singular user-centric design phase shall be given the go ahead for the development of a powerful database. Implementing the forces of MySQL and normalization fundamentals Our team will be fed data, structured and efficient storage solutions that power the driving schools operations process. This functional design system is not merely for the purpose of exigency but also personalizes the educational process for the students, guiding them from their first drive lesson till they get to their successful driving accomplishment.

In general, this project is different from the usual database development. Here the tailored leaves are not one part of the multifaceted challenges schools face untouched. The initial designs should be folders and reports and these would be relied on by a database architecture which would use MySQL and normalization for effectiveness and efficiency. This way, driving schools will be more confident in wholly safe drivers in future.

Driving School

Student Registration Form

Date: _____

First Name: _____

DOB: _____

Last Name: _____

Contact no: _____

Sex:

- ☐ Male
- ☐ Female
- ☐ Others

Address: _____

Email: _____

Course Selection:

- ☐ Learner's Permit (Subjective)
- ☐ Motorcycle Training
- ☐ Car Training
- ☐ Driving Mock Test
- ☐ Full Package (includes all*)

Preferred Schedule:

- ☐ Morning
- ☐ Afternoon
- ☐ Evening

Special Request/Notes: _____

Driving School

Employee Information Form

Employee ID: _____

Date Joined: _____

First Name: _____

Phone no: _____

Last Name: _____

Email : _____

Sex:

- ☐ Male
- ☐ Female
- ☐ Others

Address: _____

Street: _____

ZipCode: _____

Position: _____

Department: _____

Availability: _____

Qualification: _____

Speciality: _____

Driving School

Instructor's Form

First Name: _____

Last Name: _____

Sex:

- ☐ Male
- ☐ Female
- ☐ other

Vehicle no. : _____

Vehicle Assigned: _____

Course Assigned: _____

Availability: _____

Qualifications: _____

Specialities: _____

Level:

- ☐ Manager
- ☐ Senior Instructor
- ☐ Instructor

Driving School

Course Information Form:

Course Name: _____

Assigned Instructor's First Name: _____

Assigned Instructor's Last Name: _____

Student ID: _____

Start Date: _____

Duration: _____

Level:

- ☐ Beginner
- ☐ Intermediate
- ☐ Advanced

Schedule details:

Class Days: _____

Class Time: _____ to _____

Driving School

Payment Form:

Invoice number: _____

Student\'s First Name: _____

Student\'s Last Name: _____

Student ID: _____

Email: _____

Course enrolled: _____

Payment date: _____

Methods of Payment:

- ☐ Cash
- ☐ Card
- ☐ Cheque

Amount: _____

Payer's Signature:

Driving School

Vehicle Information Form

Date: _____

Vehicle Make: _____

Vehicle Type: _____

Model: _____

Year: _____

License Plate Number: _____

Last Maintenance: _____

Vehicle Number: _____

Driving School

Vehicle Maintenance Information Form

Vehicle Type: _____

Maintenance Date: _____

Last maintenance: _____

Service Type:

- ☐ Routine Check
- ☐ Oil Change
- ☐ Tire Change

Service Provider: _____

Service Cost: _____

Next Scheduled Maintenance: _____

Student Enrollment report

Student ID	Course Name	Course Level	Assigned Instructor	Start Date	End Date	Status
1	Basic Driving	Beginner	101	01/04/2024	02/04/2024	Active
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

Daily Lesson report of each students

Student ID	Last Name	First Name	Instructor ID	Vehicle ID	Duration (hrs)	Course Name	Mileage Used
2	Humagain	Sushant	101	5	00:58	Basic driving	25miles
xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxx	xxxx
xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxx	xxxx

Vehicle Maintenance report

Vehicle ID	Inspection Date	Mileage at Inspection	Faults Found	Action Taken	Cost	Next Service Due
5	01/20/2024	45,000 miles	Tire wear	Tires replaced	\$400	07/21/2024
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

Transaction report

Office Location	Date	Lesson Type	Student ID	Lesson Fee	Payment Method	Payment Status
Glasgow	02/25/2024	Basic Driving	3	\$250	Credit Card	Paid
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx

Routine Transaction:

1. Retrieving the list of instructors based on their seniority
 - Input: Type of Instructor (Manager, Senior Instructor, Instructor)
 - Output: Get list of all instructors of the selected type.
2. Getting the list of students assigned to a particular instructor.
 - Input: Select the Instructor and click on “Show Students”
 - Output: Get the list of assigned students with their details.
3. Generate Course Booking detail.
 - Input: Enter the student detail, instructor detail, and lesson detail.
 - Output: Get lesson booking generated.
4. Obtain the course detail for a specific student.
 - Input: Enter the student id and click on “Fetch Course Detail”.
 - Output: Get the details of course taken.
5. Get the progress report for a specific student
 - Input: Enter the student id and click on “Progress Report”.
 - Output: Get the details of the student's progress.
6. Get the list of cars due for the vehicle maintenance on a specific date.
 - Input: Enter the date and click on “ Cars Due for maintenance”.
 - Output: Get the list of cars due for maintenance on that date.
7. Fetch the vehicle allocation details of a specific instructor.
 - Input: Enter the instructor id.
 - Output: Get the details of the car allocated to that instructor.
8. Display the details of the total lessons given by a specific instructor.

- Input: Enter the instructor id and click on “ Total Lessons”.
- Output: Get the details of total lessons given by that instructor.

List of Assumptions:

- ❖ All offices of the Smooth Drive College of Motoring will use a single, centralized database system for managing their operations.
- ❖ The office operates from 8:00 a.m. to 8:00 p.m., and all lessons must start and end within these hours.
- ❖ A student can only have one active instructor at a time, but they can change instructors throughout their learning process.
- ❖ Each instructor is allocated one car and no two instructors share the same car.
- ❖ Lessons and cars do not overlap for a given instructor.
- ❖ All lessons are one hour long.
- ❖ As the driving test will be given outside of the school, the instructor's role is to make students ready for the test.
- ❖ A student must register at an office before they can book lessons or take a driving test.
- ❖ All cars are regularly inspected for faults. Any faults found are recorded and addressed.

Data Dictionary

Field Name	Data Type	Size	Constraints	Description
Address	VARCHAR			Student's residential address.
Amount	DECIMAL	10,2	NOT NULL	Amount of the payment.
CourseID	INT	N/A	PRIMARY KEY	Unique identifier for each course.
CourseName	VARCHAR	255	NOT NULL	Name of the course.

Date	DATE	N/A	NOT NULL	Date of the payment.
Date	DATE	N/A	NOT NULL	Date of the maintenance service.
Date of Birth	DATE	N/A		Student's date of birth.
Department	VARCHAR	50		Department where each employee work
Description	TEXT	500		Brief description of the course.
Duration	INT			Duration of the course in hours.
End date	DATE		NOT NULL	Course completion date of student
Email	VARCHAR	100		Student's email address.
Email	VARCHAR	255		Instructor's email address.
Employee ID	INT	N/A		Unique identifier for each employee
Feedback score	INT	10		Student rate their instructor on feedback score
First Name	VARCHAR	30	NOT NULL	Student's full name.
First Name	VARCHAR	30	NOT NULL	Instructor's full name.
InstructorID	INT	N/A	PRIMARY KEY	Unique identifier for each instructor.
Last Name	VARCHAR	30		
Last Name	VARCHAR	30		Instructor's last name.
Lesson completed	INT	10		Student completed their lesson till now
Lesson type	VARCHAR	50		Type of lesson student choose
Lesson fee	INT	10		Cost of each lesson
Level	VARCHAR	50		Difficulty level of the course.
Licence plate number	VARCHAR	20	NOT NULL	One of the unique identification of the vechile
MaintenanceID	INT	N/A	PRIMARY KEY	Unique identifier for each maintenance record.
Maintenance date	DATE			Date when maintenance is done
Make	VARCHAR	255	NOT NULL	Vehicle make.
Method	VARCHAR	255	NOT NULL	Payment method (e.g., Cash, Credit Card).

Mileage	INT		NOT NULL	Vehicle mileage at the time of service.
Model	VARCHAR	255	NOT NULL	Vehicle model.
Pass rate	DECIMAL	(5,2)		Passing rate of an instructor
PaymentID	INT	N/A	PRIMARY KEY	Unique identifier for each payment transaction.
Payment date	DATE			Date where payment is done by the student
Payment method	VARCHAR	50		Method used by student to pay for their course
Payment status	VARCHAR	20		Payment status of studnet (paid or unpaid)
PhoneNumber	INT	15		Student's contact number.
PhoneNumber	INT	15		Instructor's contact number.
Position	VARCHAR	50		Position for employee
Qualifications	VARCHAR	255		Instructor's qualifications.
Registration No.	VARCHAR	255		Vehicle registration number.
Service cost	INT	15		Cost of maintenance
Service Due	Date	N/A	NOT NULL	Next Service due date
Service provider	VARCHAR	20		Service provide by some company for maintenance of vehicle
Sex	VARCHAR	30	NOT NULL	Employee, instructor, and student Gender
Specialties	VARCHAR	255		Areas of special expertise.
Start date	DATE		NOT NULL	Enrolled Date of student
Status	VARCHAR	50	NOT NULL	Status of the payment (e.g., Pending, Completed).
StudentID	INT		PRIMARY KEY	Unique identifier for each student.
StudentID	INT	N/A	FOREIGN KEY	Identifies the student making the payment.
Vehicle no.	INT	N/A	PRIMARY KEY	Unique identifier for each vehicle.
Vehicle no.	INT	N/A	FOREIGN KEY	Identifies the vehicle serviced.
Vehicle type				Type of vehicle used

Year	YEAR	N/A		Year of manufacture.
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Cross Reference Table:

Data Items	Student Registration	Employee Information Form	Instructor's Form	Course Information	Vehicle information	Vehicle maintenance	Payment Form
Student ID	✓			✓			✓
First Name	✓	✓	✓				✓
Last Name	✓	✓	✓				✓
Date of Birth	✓						
Sex	✓		✓				
Address	✓	✓					
Contact Number	✓	✓					
Email	✓	✓					✓

Course selection	✓		✓				
Date Joined		✓					
Preferred Schedule	✓						
Employee ID		✓					
Position		✓					
Department		✓					
Availability		✓	✓				
Qualification		✓	✓	✓			
Speciality		✓	✓	✓			
Course Name				✓			
Course Assigned			✓				
Vehicle Number					✓		
Vehicle Assigned			✓				
License Number					✓		
Instructor ID							

Assigned Instructor First Name				✓			
Assigned Instructor Last Name				✓			
Start Date				✓			
Duration				✓			
Class Day				✓			
Date	✓				✓		
Class Time				✓			
Invoice number							✓
Number of Lessons							
Vehicle Make					✓		
Vehicle Type					✓	✓	
Model					✓		
Year					✓		
Last Maintenace					✓	✓	
Maintenance date						✓	

Course Enrolled							✓
Amount							✓
Payer's Signature							✓
Service Provider						✓	
Service Cost						✓	
Next maintenance						✓	
Service type						✓	
Data Items	Student Enrollment Report	Daily Lesson Report	Instructor Performance Report	Student's Progress Report	Vehicle Maintenance Report	Transaction Report	
Student Name	✓	✓		✓		✓	
Student ID	✓			✓			
Course Name	✓			✓			
Course Level	✓						
Assigned Instructor	✓						

Start Date	✓						
End Date	✓						
Status		✓	✓				
First Name		✓	✓				
Last Name			✓				
Instructor ID		✓	✓				
Course ID		✓					
Vehicle ID		✓			✓		
Duration		✓					
Course Name		✓		✓			
Milage Used			✓				
Course Taught			✓				
Students taught			✓				
Pass Rate							
Lesson Completed				✓			
Skill Mastered				✓			
Instructor				✓			
Vehicle No.				✓			

Comments				✓			
Inspection Date					✓		
Mileage at Inspection					✓		
Faults Found					✓		
Action Taken					✓		
Cost					✓		
Next Service Due					✓		
Office location						✓	
Lesson Type						✓	
Lesson Fee						✓	
Payment Method						✓	
Payment Status						✓	