

## **Database Management System – cs422 DE**

### **Lab 3 – Week 7**

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#### **This Lab is based on Conceptual and Logical DB design.**

- Submit your *own work* on time. No credit will be given if the lab is submitted after the due date.
  - Note that the completed lab should be submitted in .doc, .docx, .rtf, .pdf or .zip format only.
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#### **The EasyDrive School of Motoring case study**

Solve exercise 17.11/16.11 from the 5<sup>th</sup> /4<sup>th</sup> edition of the course text book.

EasyDrive School of Motoring case study is documented in Appendix B.2. Read it properly.

To get full credit for this lab, you need to complete the following 2 tasks.

- (1) Create a conceptual data model for the above case study. State any assumptions necessary to support your design.

**ANS:**

#### **Main Entities**

- Office
- Staff (Manager, Senior Instructor, Instructor, Administrative Staff)
- Client
- Interview
- Lesson
- Car
- CarInspection
- DrivingTest

#### **Key Relationships**

- An Office employs many Staff and registers many Clients.
- Each Office has exactly one Manager.
- A Client registers at one Office
- A Client attends one or more Interviews, each conducted by one Instructor.
- A Client books one or more Lessons.
- Each Lesson is taught by one Instructor and uses one Car.
- Each Instructor is allocated one Car.
- A Car undergoes many Inspections.
- A Client may sit multiple Driving Tests.
- Each Driving Test records pass/fail results and failure reasons

#### **Assumptions**

- Staff roles are modeled using a single **Staff** entity with a role attribute.
- Clients can change instructors during training.
- Lessons always start and end at the same office.
- Driving tests are external but results are recorded internally.

(2) Create and validate a logical data model from the conceptual data model created in (1) above.

ANS:

Relations (Primary Keys underlined)

- Office(office\_id, address, city, phone)
- Staff(staff\_id, name, gender, age, role, office\_id)
- Client(client\_id, name, gender, license\_no, office\_id)
- Interview(interview\_id, date, client\_id, instructor\_id)
- Lesson(lesson\_id, date, time, mileage, progress, client\_id, instructor\_id, car\_id)
- Car(car\_reg\_no, model, instructor\_id)
- CarInspection(inspection\_id, date, fault\_found, car\_reg\_no)
- DrivingTest(test\_id, date, type, result, failure\_reason, client\_id)

Validation

- The model is in Third Normal Form (3NF):
- No repeating groups
- All non-key attributes depend on the primary key
- No transitive dependencies
- Supports all sample queries (a)–(o), including staff counts, lesson schedules, test history, mileage averages, and inspection status.