# EEN 567 – Database Design & Management

## Case Study: Automotive Repair Information System

Develop an *automotive repair information system* to capture repair orders and print invoices for the repair of vehicles. You need to specify the assumptions that are used in your design, if there is any.

A repair order is used to track a repair. Each repair order has a number that is generated by the system, an origination date, and a completion date. A repair order has any number of notes that are used to describe the complaints, as well as document the course of a repair. A repair order is for a vehicle. After the car is diagnosed, the mechanic will decide what procedures are needed to repair it. The available procedures are stored in the information system as procedure definitions. Some procedure definitions include: Replacing starter motor; Replacing accelerator cable; State inspection; Lube, oil, and oil filter; Replacing tail light bulb; Replacing head light bucket; Repairing and replacing Pitman arm; and Servicing and repairing transmission.

In some cases, a repair estimate is prepared. In other cases, a repair is done directly. In any case, an invoice of line items required for the repair is prepared with a description, quantity, and price for each line item. A procedure may have many line items and a line item pertains to a specific procedure. Examples of line items include: Starter; Labor for starter replacement; Towing; Accelerator cable; Labor for replacing the accelerator cable; Bulb; Labor for lube, oil, and oil filter; Oil filter; Headlight adjusting screw; and State safety inspection.

The invoice is printed either as an estimate or as a final bill when the repair is complete and payable. There can be multiple invoices per repair order, including partial billing or pre-payment, as well as multiple estimates. The invoice includes the following information:

- Invoice number, which is listed on the document handed to the customer.
- Odometer mileage when the vehicle comes in and when it is finished.
- Date when the repair originated (from the repair order).
- Date when the repair is complete (from the repair order).
- Date when the invoice is printed.
- Date paid.

# Sample Queries

1. Insert a new customer into the database.
2. Delete an existing employee from the database.
3. Update the description of an existing repair order.
4. List all the repair orders belonging to a given vehicle, along with their dates when each repair was originated and completed.
5. List the details of the line items including the description, price, and quantity for the invoice of a given repair order.
6. List the repair orders completed between June 2005 and December 2005, sorted by the repair order numbers.
7. List the details of all the line items of a given procedure.
8. List the total number of procedures required by each repair order in decending order, along with the procedure description.
9. List the name of the employee who recorded more than the average number of invoices, together with the number of invoices he/she recorded.
10. For a particular invoice, list the odometer mileages (in and out), payment information, and the vehicle information.