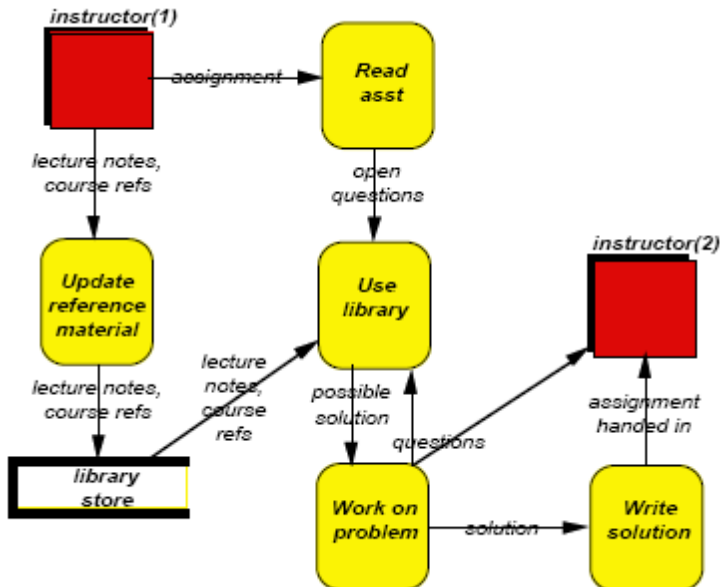


HW4 - Structured Methodologies

1) What does these DFDs say?



2) Problem

Consider the following system:

An auto service contains the following components:

- a set of mechanics. Each mechanic has a name, code and number of years in service;
- a set of clients. Each client has a name, CNP code and one or more cars;
- a set of cars. Each car has a vehicle registration certificate, a history of interventions and the mileage. The certificate contains the license plate number, the vehicle code, the brand, the year, the color, type of fuel, engine capacity and engine power;
- a set of interventions. An intervention is made by a mechanic to a car. An intervention can consist either in maintenance operations (changing the engine oil, transmission oil, cooling liquid) or in changing a damaged part with a new one. The intervention must contain the motivation, for example changing the oil because the car is at 15.000 km or changing the mirror because the car had an accident;
- a set of spare parts. A part is defined by its name (ex front wing) and the brand (ex BMW).

When the client comes with his/her car in service the cashier introduces the data in the system. The system checks for previous visits. If it is the first visit, the car is introduced in the system, otherwise the data is appended.

The client can come either at a regular check-up or after an accident. The interval between regular check-ups depends upon the brand of the vehicle and the type of engine (diesel or petroleum). After the data is input the client is directed to a mechanic.

The car is inspected and the mechanic presents the necessary interventions and the estimative cost. (the actual cost can be higher).

When the owner picks up his car the system releases an extended bill showing the outcome of the interventions and the actual cost (it cannot be higher than 150% of estimative cost). If the owner signs for

reception the interventions are added to the history of the car, he is given the bill and the interventions are added to the car record.

The service administrator can enter new spare parts in the system and the accountant can ask the system to generate financial reports.

Tasks

For the described system develop the environmental and essential models with corresponding dataflow diagrams, the entity-relationship diagram and the data dictionary according to the Structured Methodology and paying attention to the following aspects:

- On how many levels are your DFDs structured? How did you achieve this number? How many processes do you have per level?
- Nominate stores resulted from user specification and from system implementation.
- Find three different techniques for representing cardinality and modality in ER diagrams.