School of Computing and Information Technology
University of Wollongong

Session: **Autumn 2016**
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CSIT115/CSIT815 Data Management and Security
Assignment 1

Scope

This assignment consists of the tasks related to conceptual modelling of the sample database domains.

This assignment consists of 4 tasks and specification of each task starts from a new page.

Tasks

Task 1 (2 marks)

Read the following specification of a sample database domain.

A transportation company would like to create a database to record and to maintain its daily activities.

The company owns a number of trucks. Each truck is identified by a registration number and it is described by manufacturer name, model, manufacturing date, and capacity.

The company employs the drives and administration staff members. Each employee is identified employee number and it is described by first name, last name, and date of birth. It is correct to assume that the first name, last name, and date of birth uniquely identifies each employee.

Drivers are additionally described by a unique driver licence number and administration staff members are described by a collection of skills possessed.

Drivers use trucks to perform trips. A trip is described by a trip date, origin city, destination city, and the names of cities it passes through. Each trip is performed by only one driver and a driver is allowed to perform only one trip per day.

Your task is to create a conceptual schema of the sample database domain given above and to draw such schema in a notation of UML simplified classes of objects. To do so, perform analysis of the sample database domain given above in the same way as it has been explained to you in a lecture presentation 04 Conceptual Modeling. Read through the specification listed above several times and in each pass extend your conceptual schema with the new components. Start from the discovery of classes of objects, followed by the discovery of associations and association classes, followed by the discovery of attributes and links attributes, and so on. For a summary of complete process see slide 4 in a presentation 04 Conceptual Modeling.

To create the fragments of conceptual schemas and the final conceptual schema (a diagram of UML simplified classes of objects) use a diagram drawing tool UMLetlet.

It is possible to include the fragments of text into a Word document and to insert into it the fragments and the final diagram as pdf or files in other formats obtained from an option File->Export as … option of UMLetLet. A structure of the file should be similar to a structure of examples in a presentation 04 Conceptual Modeling, i.e. it should be a specification of a sample database domain with the fragments of text in a red and blue font interleaved with the UML simplified class diagrams representing the expanded solution.

The original text of specification of a sample database domain is included in a file `task1.doc` zipped into a file `assignment1-all-files.zip`.

Save the final outcomes in a file `solution1.pdf`.

Deliverables
A file `solution1.pdf` with the description of a process of conceptual modelling with the final design of a conceptual schema.

Task 2 (1.5 mark)
Read and analyse the following specification of a sample database domain.

A university would like to create a database that contains information about the subjects, students, and enrolments.

A student is described by a student number, first name, last name, date of birth, email address, contact phone number, and degree enrolled. A student number identifies each student. Students have unique email addresses and unique phone numbers. We assume that no two students have identical combinations of the values of attributes for first name, last name and date of birth.

Subjects offered by the university are described by a unique subject number, unique title, total amount of credit points granted upon successful completion of a subject, and a short description. A subject is offered for enrolment once per year, in either Autumn or Spring session. Optionally, a version number can describe a subject.

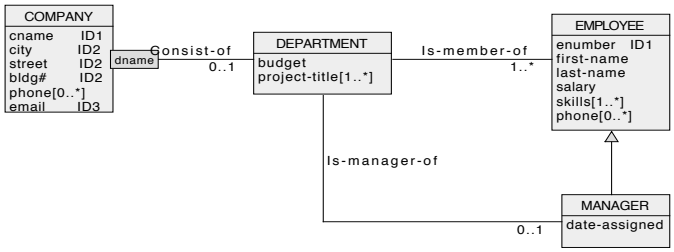
Students enrol in subjects. A student is allowed to enrol, to drop, and to enrol again a subject many times. A database should contain information about all enrolments and all drops performed by the students. An enrolment of a subject and drop from a subject are always described by an exact date and time when it has happened.

Construct a conceptual schema for the specification of a database domain listed above. Use UMLetLet to create a drawing of a conceptual schema in a notation of UML simplified class diagrams and to export the final diagram into a file `solution2.pdf`.

In this task there is NO need to provide a detailed analysis of a conceptual schema like in the previous task. The final conceptual schema expressed in a notation of UML simplified class is completely sufficient.

Deliverables
A file `solution2.pdf` with the final design of a conceptual schema.

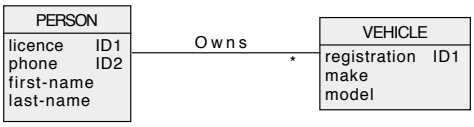
Task 3 (1 mark)
Analyse the following conceptual schema.



Write a natural language specification of a sample a database domain (like for example, the specifications written by your lecture in the tasks 1 and 2) such that it contains all information included in a conceptual schema given above. Save your specification of a sample database domain in a file `solution3.pdf`.

Deliverables
A file `solution3.pdf` with a specification of a sample database domain related to a conceptual schema given above.

Task 4 (1.5 mark)
Analyse the following conceptual schema.



Extend the conceptual schema such that after the extensions it represents the following information.

(1) *There are two types of vehicles, car and trucks, cars are described by the maximum number of passengers and trucks are described by a capacity.*

(2) *Vehicle owners register the vehicles, registrations are described registration date and fee.*

(3) *Car owners participate in car shows, car shows are organized in cities, each show is organized one time per year.*

The original conceptual schema is included in a file `task4.uxf` zipped into a file `assignment1-all-files.zip`.

Draw an extended conceptual schema and export it into a file `solution4.pdf`. Use UMLetLet to draw an extended schema and to export it to `pdf` file.

Deliverables
A file `solution4.pdf` with the extended conceptual schema.

End of specification