School of Computing and Information Technology
University of Wollongong

Session: **Spring 2018**
Lecturer: **Tianbing Xia**

CSIT115/CSIT815 Data Management and Security
Assignment 1

Scope

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

Important messages

Please read the messages listed below before implementation of the tasks included in a specification of Assignment 1.

More implementation related information can be found in "How to … ?" Cookbook available through Moodle or at:
`http://www.uow.edu.au/~jrg/115/COOKBOOK`.

The outcomes of Assignment 1 are due by **Saturday, 25 August, 2018, 11.55 pm (sharp).**

Assignment 1 contributes to 6% of the total evaluation in the subject. 3 tasks are included in this assignment. Task 3 should to be done by CSIT815 students only.

A submission procedure is explained at the end of this document.

Only one submission of the outcomes of Assignment 1 is allowed and only one submission per student is accepted. Please make sure that you submit the correct files.

A submission that contains an incorrect file attached is treated as a correct submission with all consequences coming from the evaluation of the file attached.

Compressed (zipped, rared, tared, etc) files will not be evaluated.

All files left on Moodle in a state `"Draft(not submitted)"` will not be evaluated.

A submission marked by Moodle as "late" is treated as a late submission no matter how many seconds it is late.

A policy regarding late submissions is included in CSIT115/815 Subject Outline.

Tasks

Task 1 (4 marks)

Read the following specification of a sample database domain.

A management of large international airport would like to implement a database system to store information about the employees and airplanes stationed and maintained at the airport. The relevant information is as follows.

Every airplane has a registration number, and each airplane is of a specific model. The airport accommodates a number of airplane models and each model is identified by a model number (e.g. Boeing 737-200) and has a capacity and weight. A registration number uniquely identifies each airplane.

The database should store information about two groups of employees: technicians and traffic controllers. All employees are described by a full name (first, middle, and last name), employee number, hire date, and salary. Employee number is unique for the employees.

Each technician is an expert in one or more plane model(s), and his/her expertise may overlap with that of other technicians.

Traffic controllers must have an annual medical examination. For each traffic controller, we must store the date and result of the most recent medical examinations. The results of medical examinations are either "satisfactory" or "not satisfactory".

The technicians periodically perform number of tests to ensure that airplanes are still airworthy. Each test is identified by a unique FAA test number and has a name, and maximum possible score. The aviation authorities require the airport to keep track of each time a given airplane is tested using a given test. For each testing event, the information needed is date, the number of hours spent on the test, and the score the airplane received on the test.

An objective if this task is to construct a conceptual schema for the specification of a database domain listed above.

It is not allowed to add any artificial identification attributes commonly known as "id" attributes to the specification listed above.

To create a conceptual schema, analyse the sample database domain in the following way. First, read through the specification listed above and find all classes of objects. Next, read through the specification again and find all attributes. Next, read through the specification again and find all associations, link attributes, and association classes. Next, read through the specification again and find identifiers and qualifications. Finally, read through the specification and find generalizations. Entire process described above must be included in the outcomes from the implementation of this task.

To create the fragments of conceptual schema obtained after each iteration use a diagram drawing tool UMLet.

Remember to use `CSIT115-815Palette` palette !

Technically you can include the fragments of database specification listed above into a Word document and to insert into it the fragments of diagrams and the final diagram as `bmp` file obtained from `File->Export as ...` option of UMLet. A structure of the file should include the specification of a sample database domain with the fragments of text with the UML simplified class diagrams representing a solution expanded step by step. When ready convert Word document into `pdf` format and save it as a file `solution1.pdf`.

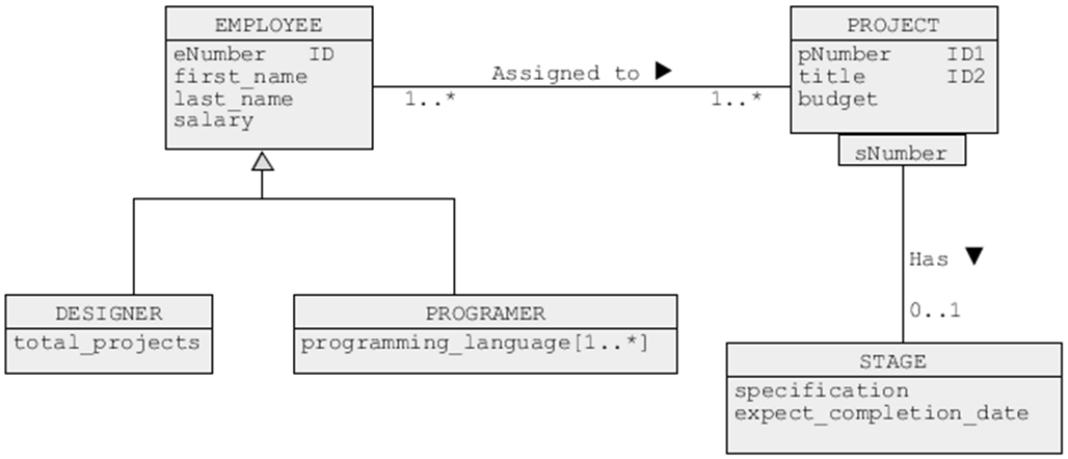
Deliverables
A file `solution1.pdf` with a description of a process of conceptual modelling together with the final design of a conceptual schema.

Submission of a file with a different name and/or different extension and/or different type scores no marks.

A report contains no description of a process of conceptual modelling scores no marks.

Task 2 (2 marks for CSIT115/DPIT115 students, 1 mark for CSIT815 students)

Analyse the following conceptual schema.



Write a natural language specification of a sample a database domain (like for example, the specifications written by your lecturer in Tasks 1 such that it contains all information included in a conceptual schema given above. Save your specification of a sample database domain in a file `solution2.pdf`.

Deliverables
A file `solution2.pdf` with a specification of a sample database domain related to a conceptual schema given above.

Submission of a file with a different name and/or different extension and/or different type scores no marks.

Task 3 (CSIT815 students only, 1 mark)
Read the following specification of a sample database domain.

We would like to store information in a database about the authors who are involved in writing the books.

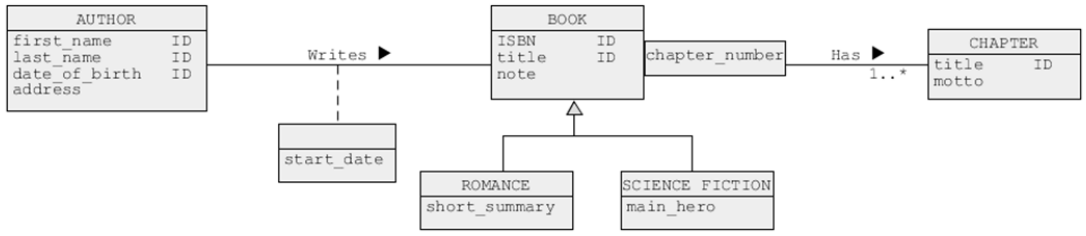
An author is described by a first name, last name, address, and date of birth. A triple of attributes (first name, last name, and date of birth) uniquely identifies each author.

An author writes many books and a book can be written by one or more writers. A book is described by a unique ISBN, a unique title, and a short note. A database should contain information when an author started writing a book.

Books are divided into chapters. A chapter is described by a chapter number, title, and optional motto. A chapter number is not a global identifier. A chapter number uniquely identifies each chapter inside a book.

Books belong to two categories: romance or science fiction. Books that belong to a romance category are described by a short summary. Books that belong to science fiction category are described by a name of the main hero.

A database designer used the specifications of database domain listed above to create the following conceptual schema.



Find and list up to 5 discrepancies between a specification of database domain and a conceptual schema created by a database designer above. Save a list of discrepancies in a file `solution3.pdf`. DO NOT create your own design! It is also not your task to correct the conceptual schema. Your task is to find and list all places where a specification is not consistent with the respective conceptual schema.

You can imagine yourself that you are employed as a tutor in the subject and your task is to evaluate a design submitted by another student and to provide a student with a feedback on what is wrong in the design. As you can see it is not so easy task to be a tutor … ;)

Deliverables
A file `solution3.pdf` with a list of 5 discrepancies between a specification of database domain and a conceptual schema created by a database designer in this task.

Submission of a file with a different name and/or different extension and/or different type scores no marks.

Submission
Note, that you have only one submission. So, make it absolutely sure that you submit the correct files with the correct contents and correct types. No other submission is possible !

Submit the files **`solution1.pdf`**, **`solution2.pdf`**, and **`solution3.pdf`** through Moodle in the following way:

(1) Access Moodle at **`http://moodle.uowplatform.edu.au/`**
(2) To login use a **`Login`** link located in the right upper corner the Web page or in the middle of the bottom of the Web page
(3) When logged select a site **`CSIT115/DPIT115/CSIT815 (S218)Data Management and Security`**
(4) Scroll down to a section **`Submissions`**
(5) Click at a link **`In this place you can submit the outcomes of Assignment 1`**
(6) Click at a button **`Add Submission`**
(7) Move a file **`solution1.pdf`** into an area **`You can drag and drop files here to add them`**. You can also use a link **`Add…`**
(8) Repeat step (7) for the files **`solution2.pdf`**, and **`solution3.pdf`**.
(9) Click at a button **`Save changes`**
(10) Click at a button **`Submit assignment`**
(11) Click at the checkbox with a text attached: **`By checking this box, I confirm that this submission is my own work, …`** in order to confirm the authorship of your submission
(12) Click at a button **`Continue`**

It is expected that all its tasks included within **Assignment 1** will be implemented **individually without any cooperation** with the other students. If you have any doubts, questions, etc. please consult your lecturer or tutor during lab classes or office hours. Plagiarism will result in a **FAIL** grade being recorded for that assessment task.

End of specification