School of Computing and Information Technology   Session: **Autumn 2024**
University of Wollongong   Subject coordinators: **Chen Chen**
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CSIT882 Data Management Systems

Assignment 1
Due: Friday 22 March 2024 8:00 pm

<u>**Scope**</u>
This assignment is related to conceptual modelling of a sample database domain and extensions of a given conceptual schema.

Please read very carefully the information listed below.
This assignment contributes to 0% of the total evaluation in the subject CSIT882.

The outcomes of the assignment work are due by **Friday 22 March 2024 8.00 pm (sharp).**

A submission procedure is explained at the end of the specification.

This assignment consists of 2 tasks and the specification of each task starts from a new page.

It is recommended to solve the problems before attending the laboratory classes in order to efficiently use supervised laboratory time.

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 the subject outline.

A submission of compressed files (zipped, gzipped, rared, tared, 7-zipped, lhzed, … etc) is not allowed. The compressed files will not be evaluated.

It is expected that all tasks included in **Assignment 1** will be solved **individually without any cooperation** from 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 <u>**FAIL**</u> grade being recorded for the assessment task.

Tasks
Task 1
It is recommended to complete this task by the end of week 3.

Consider the two database domains given below. Create a separate conceptual schema for each one of the database domains.

(1) Create a conceptual schema for the following database domain:

```
We would like to store information in a database about
companies. A company has a name, address, phone number,
website address. The company name and address can
uniquely identify a company. A job is described by a
unique job number, descriptions, title, offered by
company name, starting date, optional salary and a list
of required skills. Each candidate has a candidate
number, name, email, and phone number. The candidate
number is unique. Different candidates have different
emails. A company can offer many jobs or no jobs at all.
A job can only be offered by one company. A candidate
applies for many (zero or more) jobs. A job can be
applied by many (zero or more) candidates. We want to
record the date of submission for each application. A
candidate cannot apply for the same job more than once.
```

(2) Create a conceptual schema for the following 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 one or more 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 and science fiction. Books that belong
to the romance category are described in a short summary.
Books that belong to the science fiction category are
described by a name of the main hero.
```

Please read very carefully the information listed below.

To create a conceptual schema, use a methodology explained to you in the presentation 04 Conceptual Modeling. **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. If you still do not understand how the problem should be solved, please review the examples shown in the lecture slides and the Cookbook recipe 2.2.

You will need to use the UMLet application to draw two conceptual schemas, such as `task1_1.uxf` and `task1_2.uxf`. Remember to use the `CSIT882 Palette` palette!

You must draw the conceptual schema in a notation of UML simplified classes of objects explained to you during the lecture classes in CSIT882. No other notation will be accepted!

It is not allowed to add any artificial attributes (not specified in the database domain) to the classes listed above.

When you are ready, use the option `File->Export as...` to export your diagrams in `BMP` format. Then insert the BMP files into a Word file, such as `solution1.docx`. Clearly mark the question numbers. When ready convert the Word file into a pdf file `solution1.pdf`.
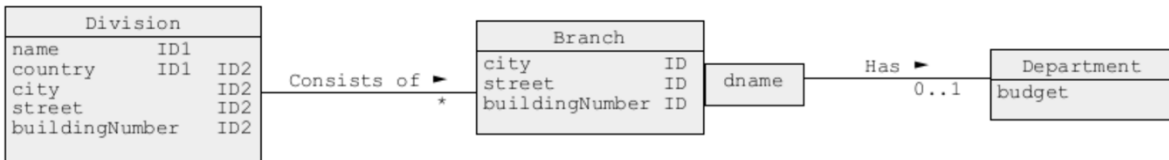
Deliverables
A file `solution1.pdf` with the final design of the conceptual schemas. Submission of a file with a different name and/or different extension and/or different type scores no marks.

Task 2
It is recommended to complete this task by the end of week 4.
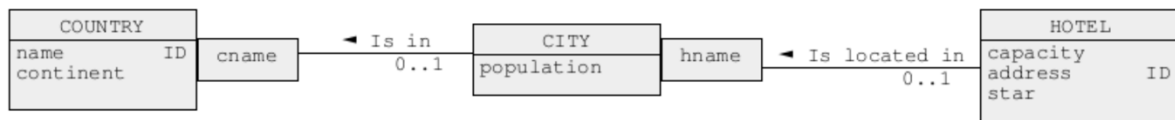
(1) Consider the conceptual schema about the organizational structure of a dairy product company given below and the list of extensions to the database domain. Modify the conceptual schema to make it consistent with the required extensions. Note that, only one (the final with all the extensions) conceptual schema is expected.

We would like to extend the database domain in the following ways.

```
(a) Each branch has a branch name, which is unique within the
division it belongs to.
(b) A department is entirely located at one level of a building. We
need to store the level of the building. There are three types of
departments: Finance department, HR department, and IT department.
(c) Employees work in departments. Each employee works in one
department. A department has one or more employees. A description of
an employee consists of the employee number, first name, last name,
date of birth and salary. An employee number identifies an employee.
First name, last name and date of birth together identify an
employee too.
```

(2) Consider the conceptual schema about a hotel chain given below and the list of extensions about customers to the database domain. Modify the conceptual schema to make it consistent with the required extensions. Note that, only one (the final with all the extensions) conceptual schema is expected.

We would like to extend the database domain in the following ways.

```
(a) A description of a customer consists of the first name, last
name, date of birth and optional nationality.
(b) The first name, last name and date of birth together identify a
customer.
(c) Customers book hotels.
(d) A booking is described by booking date, room type, expected
arrival date, the total number of days a booking is valid for and
the rate.
(e) A customer can only book a hotel once a day.
```

Please read very carefully the information listed below.

You will need to use the UMLet application to draw two conceptual schemas, such as `task2_1.uxf` and `task2_2.uxf`. Remember to use the `CSIT882 Palette` palette!

You must draw the conceptual schema in a notation of UML simplified classes of objects explained to you during the lecture classes in CSIT882. No other notation will be accepted!

It is not allowed to add any artificial attributes (not specified in the database domain) to the classes listed above.

When you are ready, use the option File->Export as... to export your diagrams in `BMP` format. Then insert the BMP files into a Word file, such as `solution2.docx`. Clearly mark the question numbers. When ready convert the Word file into a pdf file `solution2.pdf`.

Deliverables
A file `solution2.pdf` with the final design of the conceptual schemas. 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,` 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 **CSIT882 (S124) Data Management Systems**
(4) Scroll down to a section **Submissions**
(5) Click on a link **In this place you can submit the outcomes of Assignment 1**
(6) Click on 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 file **solution2.pdf**
(9) Click on 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
(10) Click on the button **Save changes**

End of specification