

## **CSIT115/CSIT815 Data Management and Security**

### **Laboratory 1**

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#### **Scope**

This laboratory includes the tasks related to the simple applications of software systems that will be used in a subject CSIT115/815 Data Management and Security in Spring session 2019.

The outcomes of the laboratory work are due by **Saturday 10 August 2019, 7.00 pm (sharp)**.

**Please read very carefully information listed below.**

This laboratory contributes to 3% of the total evaluation in a subject CSIT115 and it contributes to 3% of the total evaluation in a subject CSIT815.

A submission procedure is explained at the end of specification.

This laboratory work consists of 3 tasks and 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.

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

An implementation that does not compile due to one or more syntactical errors scores no marks.

It is expected that all tasks included within **Laboratory 1** will be solved **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 the assessment task.

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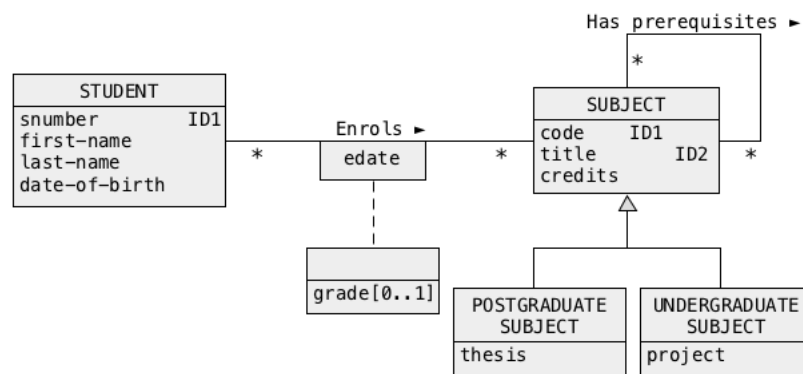
## Tasks

### **Task 1 (1 mark)**

An objective of this task is to show you how to create conceptual database schema with UMLet 14.3.

Perform the following steps.

- (1) Start and connect to your Windows system.
- (2) UMLet 14.3 is a tool for drawing UML diagrams. To start UMLet 14.3 use UMLet shortcut available in a folder Programming Apps located on Desktop. The shortcut has an icon that consists of a red circle crossed with a horizontal red bar with a white text UMLet.
- (3) When UMLet is started, navigate to the right upper corner of UMLet window and pick a palette CSIT115-815Palette. Do not use any other palette !
- (4) Use UMLet application to draw a diagram given below. It is explained in the Cookbook, Recipe 2.1, Steps 1 and 2 "How to create very simple conceptual schemas with UMLet?" how to use UMLet to create class diagrams. For a moment, do not worry about the meanings of a diagram created. It will be explained to you later on during the lecture classes.



- (5) When ready, add one more attribute to a class SUBJECT and one more association between the classes STUDENT and SUBJECT. The new attribute and the new association are up to you.
- (6) Use an option File->Save to save your diagram in a file solution1.uxf. Do not delete a file solution1.uxf.

- (7) Use an option File->Export as... to export your diagram into a file `solution1.bmp` in BMP format. Do not delete an exported file. You will submit it as one of the deliverables from your laboratory work.

### **Deliverables**

A file `solution1.bmp` that contains a diagram given above extended with an attribute and with an association. A submission of a file `solution1.uxf` is not expected and it scores no marks. Submission of a file with a different name and/or different extension and/or different type scores no marks as well. It is strongly recommended to check the contents of a file `solution1.bmp` **BEFORE** the submission and not after the submission.

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**Task 2(1 mark)**

An objective of this task is to learn how to use SQL Developer. SQL Developer is a Graphical User Interface (GUI) to MySQL database server.

Perform the following steps.

- (1) Start and connect to your Windows 10 system.
- (2) To start VirtualBox use a shortcut to Oracle VM Virtual Box available in a folder Virtual Machines located on Desktop.

It is explained in Cookbook, Recipe 1.1, Step 1 "How to start VirtualBox ?" how to start VirtualBox.

- (3) When VirtualBox is started, import an appliance Ubuntu19.04-64bits-MySQL8.0.16-03-JUL-2019 located on a drive VMs(E:) in a folder Virtual Machines\CSIT115-Janusz. It is explained in Cookbook, Recipe 1.1 Step 2 "How to import an appliance to VirtualBox ?" how to import an appliance.
- (4) It is strongly recommended to copy a file Ubuntu19.04-64bits-MySQL8.0.16-03-JUL-2019 to your USB drive. It will allow you to import it to VirtualBox installed on your system at home. Then, the same software as installed in a laboratory class can be used at home. Unfortunately, you still have to come to the laboratory classes ☹.
- (5) Power on a virtual machine Ubuntu19.04-64bits-MySQL8.0.16-03-JUL-2019. It is explained in Cookbook, Recipe 1.1 Step 4 "How to power on a virtual machine ?" how to power on a virtual machine.
- (6) When Ubuntu 18.04 operating system displays an orange box with a name CSIT115 user press Enter key and then type csit115 into a Password field. Then, patiently wait until an operating system displays a column of icons on the left-hand side of a screen.
- (7) To start SQL Developer GUI leftclick at the 8th icon from top (the first from bottom) with a large grey cylinder and large green triangle.
- (8) Next, to open csit115 connection, rightclick at an icon associated with csit115 connection within MySQL Connections group in Connections panel in left upper corner of SQL Developer window.
- (9) Select Connect, type csit115 into a field Password, and click at OK button.

- (10) SQL Developer opens a new sub-window `csit115`.

Type

```
use csit115;
```

command into the sub-window.

Move a mouse cursor to any location within `use` command and leftclick at a large green rectangle to process the command to choose `csit115` as a default database.

The results from processing are displayed below in `Script Output` sub-window.

- (11) Type into a panel `csit115` the following lines with SQL statement `CREATE TABLE`.

```
CREATE TABLE FIRST_NAME (  
    name VARCHAR(20) NOT NULL,  
    CONSTRAINT FN_PK PRIMARY KEY(name) );
```

SQL statement listed above creates a single column relational table `FIRST_NAME`.

Move a mouse cursor to any location within `CREATE TABLE` statement and leftclick at a large green triangle to process the statement.

The results from processing are displayed below in `Script Output` sub-window.

- (12) Save the text typed in the previous step as SQL script in a file `task2.sql`. To do so use `File->Save` options of SQL Developer. Do not delete a file `task2.sql`. You will submit it as one of the deliverables from your laboratory work.

- (13) Type into `csit115` sub-window the following `INSERT` statement of SQL.

```
INSERT INTO FIRST_NAME ('James');
```

- (14) To process the statement above leftclick at large green triangle. This time you should get an error message in a bottom sub-window.
- (15) A keyword `VALUES` is missing between `FIRST_NAME` and left bracket `(`. Add the keyword and process the statement again. I hope that this time you do not get any errors :).

- (16) Add and process the following `SELECT` statement to list the contents of a relational table `FIRST_NAME`.

```
SELECT *  
FROM FIRST_NAME;
```

- (17) Finally, add SQL statement `DROP TABLE` that drops a relational table `FIRST_NAME`. Process `DROP TABLE` statement to drop a relational table `FIRST_NAME`.

```
DROP TABLE FIRST_NAME;
```

- (18) Now, SQL script is complete. Save it in a file `task2.sql`.

- (19) In the previous steps we processed SQL script in a statement by statement mode. This method is good when creating or when debugging a script. It is also possible to process an entire script with a single mouse click. To do so leftclick at an icon with a small green triangle next to an icon with a large green triangle.

A sequence of steps explained above is a typical development procedure for SQL scripts. We create SQL statement, test it, save the presents state of a script in a file and progress to create the next SQL statement, test it, remove errors whenever it is necessary, and save the most recent version of a script. It is strongly recommended to work in this way when creating and testing SQL scripts. It is an approach that can be summarized as *implement a bit, test a bit, save a bit*. Writing an entire script and trying to test in one go may result with a large number of errors usually contributing to panic, frustration, and unhappiness.

### **Deliverables**

A file `task2.sql` with SQL script created and tested in Task 2. Submission of a file with a different name and/or different extension and/or different type scores no marks.

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### Task 3 (1 mark)

An objective of this task is to learn how to use a command line interface `mysql` to process SQL scripts and how to create and save the reports from processing of SQL scripts.

In the future we shall frequently ask you to provide a report from processing of SQL script earlier created and tested with SQL Developer. Task 2 is the only task when we ask you to submit SQL script. In all other laboratory and assignment tasks we shall ask you to submit a **report from processing of SQL** and not SQL script itself. So, how to create a report from processing of SQL script developed in the previous task ?

Perform the following steps.

- (1) If you have not done Task 2 yet then do it now ! Otherwise proceed from the next step.
- (2) Start Terminal program. It is visualized as a grey rectangle icon with rounded corners and small white `>_` signs in a column of icons on left hand side of a screen (it is the 5<sup>th</sup> icon from top).
- (3) To start a command line interface (CLI) MySQL database server type at a command prompt in Terminal window:

```
mysql -u csit115 -p -v -c
```

and press Enter key. A password you are asked about is `csit115`.

- (4) When a command line interface to MySQL database server is started process a command:

```
use csit115;
```

at `mysql>` prompt to select `csit115` database.

- (5) Next, process the following commands in Terminal window at `mysql>` prompt

```
tee solution2.rpt;  
source task2.sql;  
notee;
```

to submit a script `task2.sql` for processing by MySQL and to save a report from processing of the script in a file `solution2.rpt`. Do not delete a file `solution2.rpt`. It will be submitted as one of the deliverables from your laboratory work.

`tee solution2.rpt` command copies the messages and results displayed on a screen into a text file, in this case into `solution2.rpt` file. `notee` command stops copying the messages and results displayed on a screen to a file.

`source task2.sql` command sends SQL statements included in script file `task2.sql` for processing by MySQL database server.

- (6) It is also possible to modify the contents of SQL script file at this stage. To do it process at `mysql>` prompt a command

```
exit;
```

To quit `mysql` CLI. Next, at `$` prompt in Terminal window process a command

```
gedit task2.sql
```

to open a text editor with SQL script file `task2.sql`. Now, you can change script, save it, and process it again in a way explained above. It is possible to develop SQL scripts with an editor and command line interface (CLI) to a database server, however, using a graphical user interface (GUI) SQL Developer is much easier.

### **Deliverables**

The files `solution2.rpt` with a report from processing of SQL script `task2.sql`. Submission of a file with a different name and/or different extension and/or different type scores no marks.

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## Submission

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

Submit the files **solution1.bmp**, **task2.sql**, and **solution2.rpt** to 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/CSIT815 (S219) Data Management & Security**
- (4) Scroll down to a section **Submissions**
- (5) Click at a link **In this place you can submit the outcomes of Laboratory 1**
- (6) Click at a button **Add Submission**
- (7) Move a file **solution1.bmp** 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 **task2.sql**, and **solution2.rpt**
- (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**

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*End of specification*