



# COS 221 Practical Assignment 1

- Date Issued: **12th February 2020**
- Date Due: **26th February 2020** before 11:00 AM
- Submission Procedure: **Upload to the web server (whaetley) and CS web**
- This assignment consists of **8 tasks** for a total of **50 marks**.

## 1 Introduction

During this practical assignment you will be required to create a database for a small invoicing system. The system includes the customer, who may buy one or more products, thus generating an invoice. Because the customer may buy more than one product at time, an invoice may contain several invoice lines, each providing details about the purchased product. The product table should contain the product to provide a consistent pricing input for each product that appears on the invoice. An ER-diagram, using Crow's Foot notation [1], of the database is given in Figure 1.

Visual Paradigm Standard(luqmaan badat(University of Pretoria))

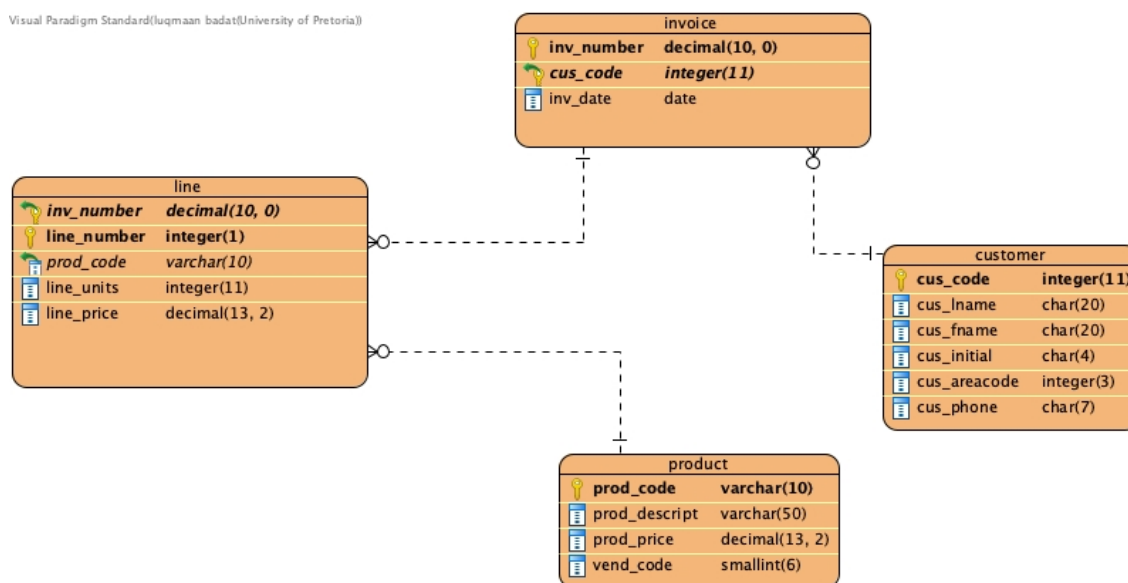


Figure 1: The ERD

*HINT: Translate the Crow's Foot notation into the notation used in the textbook. Note, a ring and crow's foot specifies a cardinality of 0 or more. A dash represents a cardinality of 1.*

After successful completion of this assignment you should be able to:

- create databases, tables and populate them with data;
- interpret ER-diagrams, even when given in Crow's Foot notation;
- implement referential integrity constraints like the primary key, foreign key and composite key in different relationships between entities; and

- learn how to export databases (database dump) for purposes of backing up a database so that its contents can be restored in the event of data loss.

## 2 Constraints

1. You must complete this assignment individually.
2. The SQL scripts will be marked
  - (a) Scripts which run and perform what they are supposed to do get full marks
  - (b) Scripts which run but do not perform as required, will receive partial marks
  - (c) Scripts which do not run will be allocated partial marks based on the functionality they would have exhibited.
3. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.
4. You may utilise any text editor or IDE, upon an OS of your choice. In the Informatorium you will need to use MySQL Workbench to access your databases on **wheatley**.

## 3 Submission Instructions

You are required to upload all your source files (e.g. Entity definitions and sets as a text file) to the Computer Science web-portal. You also need to make sure that **wheatley** mirrors what you uploaded to CS web and works on the web server before the deadline. No late submissions will be accepted, so make sure you upload in good time. You will be required to download the files you uploaded to CS web and load them onto **wheatley** as part of the assessment of the practical assignment.

## 4 Online resources

You can access a free SQL Tutorial at: [https://www.w3schools.com/sql/sql\\_create\\_table.asp](https://www.w3schools.com/sql/sql_create_table.asp)

Getting Started with MySQL at: <https://dev.mysql.com/doc/mysql-getting-started/en/>

To download MySql and access the documentation on your computer. Use the official MySql site – <https://www.mysql.com/>

How to install MySql tutorial is also available on YouTube at: <https://www.youtube.com/watch?v=WuBcTJnIuzo>

There are many other resources online for example Stack overflow – <https://stackoverflow.com/> a platform for developers to learn, share knowledge and build a career.

**IMPORTANT NOTE:** Bring to the practical session your textbook and/or the lecture notes for ER-diagrams and Introduction to SQL in which the content was explained.

## 5 Rubric for marking

Connecting to MySQL on <b>wheatley</b>	5
Displaying available databases	2
Creating a database	2
<b>Creating tables</b>	
Table names	4
Column names	4
Use of datatypes	4
implementation of foreign constraints	6
implementation of primary keys	5
<b>Populating tables</b>	
Use of correct clauses	4
correct data entry	8
Query	2
Database dump	4
<b>Total</b>	<b>50</b>

## 6 Assignment Instructions

### Task 1: Installing a MySQL client on Windows ..... (0 marks)

You can install either the MariaDB or the MySQL Workbench client for the operating system of your choice. You may download either one of them from the following links: <https://downloads.mariadb.org/mariadb/10.4.12/> or <https://dev.mysql.com/downloads/workbench/>.

Run the MySQL client as per the instructions for the operating system of your choice.

### Task 2: Connecting to MySQL on wheatley ..... (5 marks)

Use the command `mysql -u{username} -p{password} -h{host server ip}` where {username} is your student number starting with u, {password} is your CS password and {host server ip} is `wheatley.cs.up.ac.za` to launch MySQL on the wheatley web server.

### Task 3: Displaying available databases ..... (2 marks)

After launching MySQL, type the command `show databases;` you should be able to see a database named `uXXXXXXX` where `XXXXXXX` is user student number.

### Task 4: Creating a database ..... (2 marks)

Create the database and name it `uXXXXXXX_invoicingsystem` where `XXXXXXX` is your student number.

### Task 5: Creating tables ..... (23 marks)

Create the corresponding four Tables as shown in the ER-diagram in Figure 1 with the appropriate constraints and attributes.

*Please refer to page 91 of the prescribed textbook (6th Edition) and page 185 (7th Edition).*

### Task 6: Populating tables ..... (12 marks)

Populate the tables with the data sets in Figures 2 and 3.

*Please make use of page 108 of the prescribed textbook (6th Edition) and page 198 (7th Edition).*

Customer	CUS_CODE, CUS_LNAME, CUS_FNAME, CUS_INITIAL, CUS_AREACODE, CUS_PHONE					
	10010,	Ramas,	Alfred,	A,	615,	844-2573
	10011,	Dunne,	Leona,	K,	713,	894-1238
	10012,	Smith,	Kathy,	W,	615,	894-2285
	10013,	Olowski,	Paul,	F,	615,	894-2180
	10014,	Orlando,	Myron,	H,	615,	222-1672
	10015,	O'Brian,	Amy,	B,	713,	442-3381
	10016,	Brown,	James,	G,	615,	297-1228
	10017,	Williams,	George,	Y,	615,	290-2556
	10018,	Farriss,	Anne,	G,	713,	382-7185
	10019,	Smith,	Olette,	K,	615,	297-3809
Invoice	INV_NUMBER, CUS_CODE,		INV_DATE			
	1001,	10014,	2012-03-08			
	1002,	10011,	2012-03-08			
	1003,	10012,	2012-03-08			
	1004,	10011,	2012-03-09			

Figure 2: Data set for Customer and Invoice

### Task 7: Simple query ..... (2 marks)

Write and execute a query to retrieve customers with the area code 615

*Apply the commands on page 98 of the textbook (6th Edition) and page 188 (7th Edition).*

### Task 8: Database dump ..... (4 marks)

Export your database from MySQL on wheatley to a text file that you will upload to the CS site before the deadline. Make use of `mysqldump` to export the database and upload the dump to the CS website.

Product	PROD_CODE, PROD_DESCRIPT, PROD_PRICE, VEND_CODE				
	001278-AB,	Claw hammer,	12.95,	232	
	123-21UUY,	Houselite chain saw,	189.99,	235	
	QER-34256,	Sledge hammer,	18.63,	231	
	SRE-657UG,	Rat-tail file,	2.99,	232	
	ZZXI3245Q,	Steel tape,	6.79,	235	
Line	INV_NUMBER, LINE_NUMBER, PROD_CODE, LINE_UNITS, LINE_PRICE				
	1001,	1,	123-21UUY,	1,	189.99
	1001,	2,	SRE-657UG,	3,	2.99
	1002,	1,	QER-34256,	2,	18.63
	1003,	1,	ZZXI3245Q,	1,	6.79
	1003,	2,	SRE-657UG,	1,	2.99
	1003,	3,	001278-AB,	1,	12.95
	1004,	1,	001278-AB,	1,	12.95
	1004,	2,	SRE-657UG,	2,	2.99

Figure 3: Data set for product and line

## References

- [1] "Entity-relationship model," 2020, downloaded on 11 February 2020 from [https://en.wikipedia.org/wiki/Entity-relationship\\_model#Crow's\\_foot\\_notation](https://en.wikipedia.org/wiki/Entity-relationship_model#Crow's_foot_notation).