COS 221 Practical Assignment 2

- Date Issued: **9th March 2022**
- Date Due: **23rd March 2022** before **11:00 (in the morning)**
- Submission Procedure: **Upload to ClickUP**
- This assignment consists of **6 tasks** for a total of **58 marks**.

1 Introduction

You have been asked 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 a time, an invoice may contain several invoice lines. Each invoice line provides 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 [**?**].

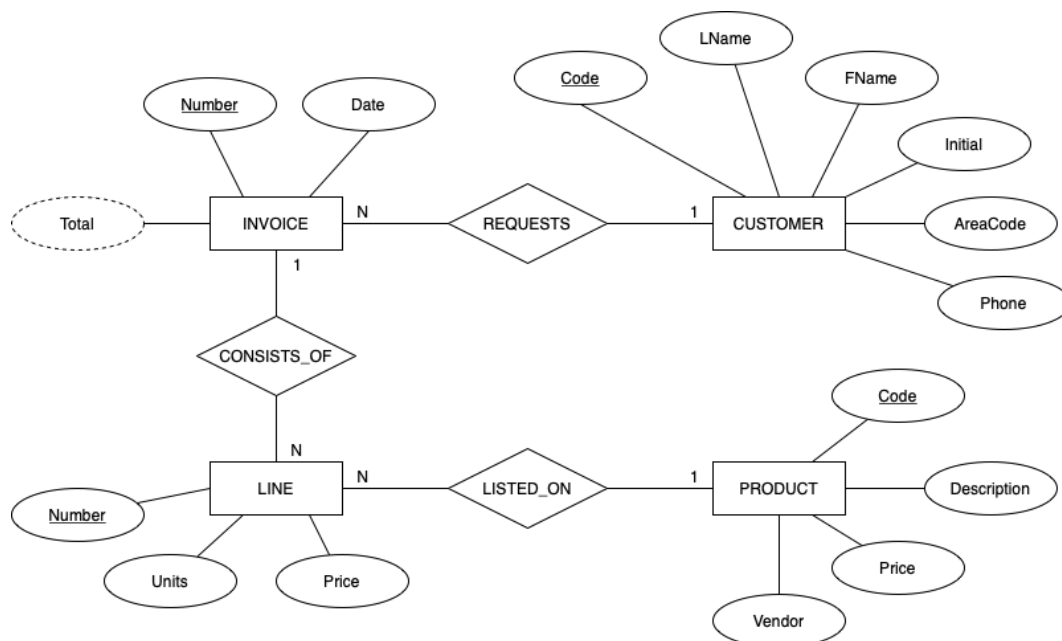An ER-diagram of the conceptual model for the database is given in Figure 1.

Figure 1: The ER-diagram for the invoicing system

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

- create databases, tables and populate them with data;
- interpret ER-diagrams;
- 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 or in pairs.

2. The database dump will be marked. The SQL scripts from the database dump:

   (a) which run and perform what they are supposed to do get full marks

   (b) which run but do not perform as required, will receive partial marks

   (c) which do not run will be allocated partial marks based on the functionality they would have exhibited.

3. You need to use your MariaDB and Workbench installations to complete the practical assignment.

3 Submission Instructions

You are required to upload a single archive that includes the following files:

- A pdf containing the answers to the tasks.

- A file or files containing the SQL statements from your database dump to:

  - create your database,

  - create the tables in your database, and

  - populate the tables with the data you populated the tables with.

- a **readme.txt** file informing the marker what they should do to install the database dump on their installation of MariaDB.

Upload your archive to ClickUP. No late submissions will be accepted, so make sure you upload in good time.

4 Online resources

The following resources will help with creating a conceptual model using Chen's Notation.

- Visual Paradigm Online: `http://online.visual-paradigm.com`

- draw.io: `http://diagrams.net`

You can access free SQL Tutorial at: `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 career.

5 Rubric for marking

Creating a database	2
Displaying available databases	4
Creating tables	
Table names	4
Column names	4
Use of datatypes	4
Inclusion of primary keys	4
Inclusion of referential integrity constraints	4
Inclusion of other constraints.	4
Population of tables	
Use of correct clauses	6
Correct data entry	6
Simple query	
Query	4
Results of query	2
Database dump	10
Total	**58**

6 Assignment Instructions

Task 1: Creating a database ....(2 marks)
Create the database and name it `uXXXXXXXX_invoicingsystem` where `XXXXXXXX` is your student number.

Task 2: Displaying available databases ....(4 marks)
After creating the database and tables, type the command `show databases;` on the MariaDB command line. You will see all the databases that have already been created on your installation of MariaBD. Take a screen capture of the command and the result and place it in your document that you will convert to PDF and include in your archive.

Task 3: Creating tables for the entities ....(24 marks)
The steps for conversion from ER-diagram to the Relational model will be discussed in detail in Lecture 14 (E(E)R to Relational mapping). For now you may assume that the mapping results in the relations given in Figure 2.
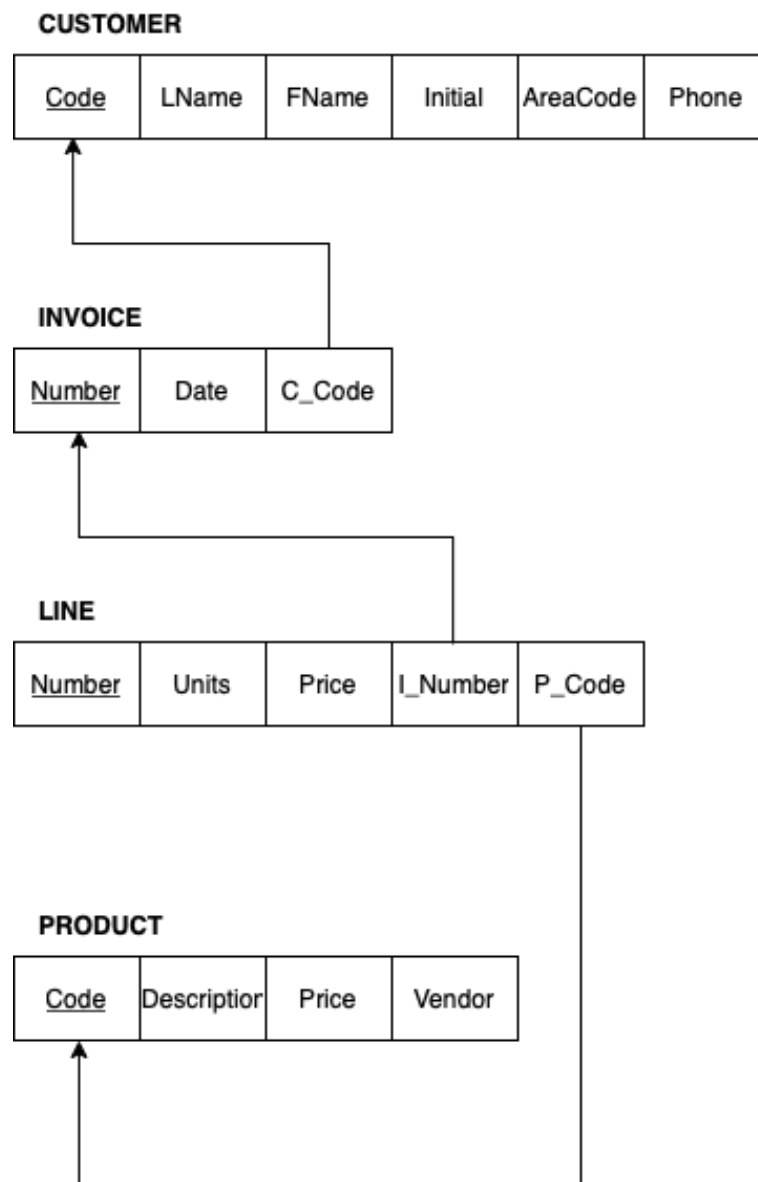

Figure 2: Relations with referential integrity

Create the corresponding four tables for the relations as shown in the Relational model in Figure 2 with the

appropriate attributes, datatypes and constraints.

Task 4: Populating tables . . . . (12 marks)

Populate the tables in the database with the extension given in Figure 3. Provide the statements you used to populate each of the tables in the PDF document.

Task 5: Simple query . . . . (6 marks)

Write and execute a query to retrieve the details of all customers with the area code `012`. Provide both the query and the result in the PDF you will be uploading.

Task 6: Database dump . . . . (10 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 so that it can be recreated in its entirety on another computer.

IMPORTANT NOTE: Please refer to the rubric for the detailed allocation of marks.

CUSTOMER

Code	LName	FName	Initial	AreaCode	Phone
C001	Peters	Johny	J	021	889-1234
C002	Nkosi	Thabo	P	011	234-9966
C003	Christie	Agatha		012	627-7530

INVOICE

Number	Date	C_Code
00011	2022-03-01	C001
00012	2022-03-09	C003

LINE

Number	Units	Price	I_Number	P_Code
1	1	200.00	00011	SL_01
2	10	10.00	00011	PR_01
3	2	1200.00	00011	PR_03
4	2	725	00012	SL_02

PRODUCT

Code	Description	Price	Vendor
SL_01	Fingerprint kit	250.00	Simple Sleuth
PR_01	Fake blood	10.00	Props unlimited
SL_02	Magnifying glass	725.00	Eye Glass
PR_02	Rope	125.00	Mountain Climbers
PR_03	Prop Gun	1456.00	UnReal

Figure 3: Relations and their state