ASSIGNMENT 1 FRONT SHEET

Qualification	TEC Level 5 HND Diploma in Computing		
Unit number and title	Unit 04: Database Design & Development		
Submission date		**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd submission**	
Student Name		**Student ID**	
Class		**Assessor name**	

Student declaration

I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.

	Student's signature	

Grading grid

P1	M1	D1

ASSIGNMENT 1 BRIEF

Qualification	BTEC Level 5 HND Diploma in Computing		
Unit number	Unit 04: Database Design & Development		
Assignment title			
Academic Year			
Unit Tutor	Pham Thuy Duong		
Issue date		Submission date	
IV name and date			

Submission Format:

Format: This assignment is an Individual assignment and specifically including 1 document:

You must use font *Calibri size 12, set number of the pages and use multiple line spacing at 1.3. Margins must be: left: 1.25 cm; right: 1 cm; top: 1 cm and bottom: 1 cm.* The reference follows Harvard referencing system. The recommended word limit is *2.000-2.500 words*. You will not be penalized for exceeding the total word limit. The cover page of the report has to be the Assignment front sheet 1.

Submission Students are compulsory to submit the assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy posted on http://cms.greenwich.edu.vn/

Note: The Assignment *must* be your own work, and not copied by or from another student or from books etc. If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style. Make sure that you know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get fail*

Unit Learning Outcomes:

LO1 Use an appropriate design tool to design a relational database system for a substantial problem.

LO2 Develop a fully functional relational database system, based on an existing system design.

LO3 Test the system against user and system requirements.

LO4 Produce technical and user documentation

Assignment Brief and Guidance:

You are employed as a Database Developer for a large IT consultancy company. The company has been approached by FPT university which is expanding due to the growth of the number of students. FPT is currently facing difficulties in dealing with managing the university. It decided to develop several academic systems to manage the university easier including: **Online Library system, Student Grading System, Attendance System, CMS System, Scheduling System, Enrollment Systems, and so on.**

You are tasked to select one of those systems to develop database for FPT university. Your tasks are to:

Work with FPT to find out about current requirements for each system

Analyze the requirements and produce clear statements of user and system requirements.

Design a relational database system using appropriate design tools and techniques

Develop a fully functional relational database system, based on an existing system design.

Test the system against user and system requirements.

Produce technical and user documentation

Part 1 (Assignment 1)

Before you start the development process, your manager has asked you to produce a report for the CEO of FPT, containing:

1. Clear statements of user and system requirements. The system must have at least 2 user roles, including business processes and statistical reports for FPT university managers.

2. The design of the relational database system using appropriate design tools and techniques. It should contain at least four interrelated tables.

You would prefer to produce a more detailed document, so you will produce a comprehensive design for a fully functional system which will include interface and output designs, data validations and cover data normalization.

Your manager would like on the report your assessment of the effectiveness of the design in relation to user and system requirements.

Part 2 (Assignment 2)

Once the designs have been accepted by your manager you have been asked to:

1. Develop the database system using evidence of user interface, output and data validations and querying across multiple tables.

You want to include more than just the basics so you will implement a fully functional database system which will include system security and database maintenance features.

2. You have decided to implement a query language into the relational database system. The developed system will be demonstrated to your manager in the report including:

- *Assessing whether meaningful data has been extracted through the use of query tools to produce appropriate management information.*
- *Evaluating the effectiveness of the database solution in relation to user and system requirements, and suggest improvements.*

3. Once the system has been developed, you will test the system and your manager will complete a witness statement indicating how your tests are performing against user and system requirements.

Besides, you will produce a brief report assessing the effectiveness of the testing, including an explanation of the choice of test data used.

4. Lastly you will produce technical and user documentation which will be given to the company.

You want to provide some graphical representations for ease of reference in the technical guide, so you have decided to produce a technical and user documentation for a fully functional system, including diagrams showing movement of data through the system, and flowcharts describing how the system works.

Learning Outcomes and Assessment Criteria		
Pass	**Merit**	**Distinction**
LO1 Use an appropriate design tool to design a relational database system for a substantial problem		
P1 Design a relational database system using appropriate design tools and techniques, containing at least four interrelated tables, with clear statements of user and system requirements.	**M1** Produce a comprehensive design for a fully functional system which includes interface and output designs, data validations and data normalisation.	**D1** Assess the effectiveness of the design in relation to user and system requirements.

Table of Contents

P1. Design a relational database system using appropriate design tools and techniques, containing at least four interrelated tables, with clear statements of user and system requirements.

I. Database Design.

1.Scenario of the chosen system.

Project Specification:

I perform the segment of managing to borrow and return books in the library. The readers borrow a book by filling in readers information, address, book title, and author name of the book. Many readers can borrow many books from the library. Many books are supplied, and belong to by a publisher. Many books are written by many authors. Readers borrow books from the library and one book have many book authors.

2.SRS (System Requirement Specification).

● Reasons for the project: Readers will find it easier to update and return books. Library management also manages books when students borrow and return books in an easier way.

● Request and Expectation.

+ **Request**

- The user is provided with a separate account.

- Users can search for books.

- Users can be given a separate area for storing data.

+ **Expectation**

- Readers' information is not stolen.

- Support libraries manage information from readers and students more easily.

- Supports the management of all books in the library.

- Support for searching information quickly and conveniently.

● Objectives: Things intended to achieve

- Personal information should be kept confidential.

- Easily search for books when students need to borrow.

- Easy to use the system.

- For library management, you can easily check student loans and repayment dates.

- Easily check the number and location of books in the library.

● Tasks and deliverable.

- Evaluate whether meaningful data has been extracted using query tools to generate pertinent management information.

- Evaluate the effectiveness of the database solution in relation to students' requirements with the system, and suggest improvements.

- Generate engineering, readers, librarians, documentation for a fully functional system, including diagrams that show the movement of data across the system, and diagrams describing how the system works.

3.Logical design (ERD)

I perform the segment of managing to borrow and return books in the library. The readers borrow a book by filling in readers information, address, book title, and author name of the book. Many readers can borrow many books from the library. Many books are supplied, and belong to by a publisher. Many books are written by many authors. Readers borrow books from the library and one book have many book authors.

Cross Reference Entities for Relationships

Entity	Relationship	Entity
Readers	Borrow	Borrow Book
Borrow Book	Have	Book
Book	Belong to	Publisher

Add Multiplicity

Entity	Multiplicity	Relationship	Multiplicity	Entity
Readers	1	Borrow	n	Borrow Book
Borrow Book	n	Have	1	Book
Book	n	Belong to	1	Publisher
Book	1	Have	n	Book Author
Book Author	n	Have	1	Author
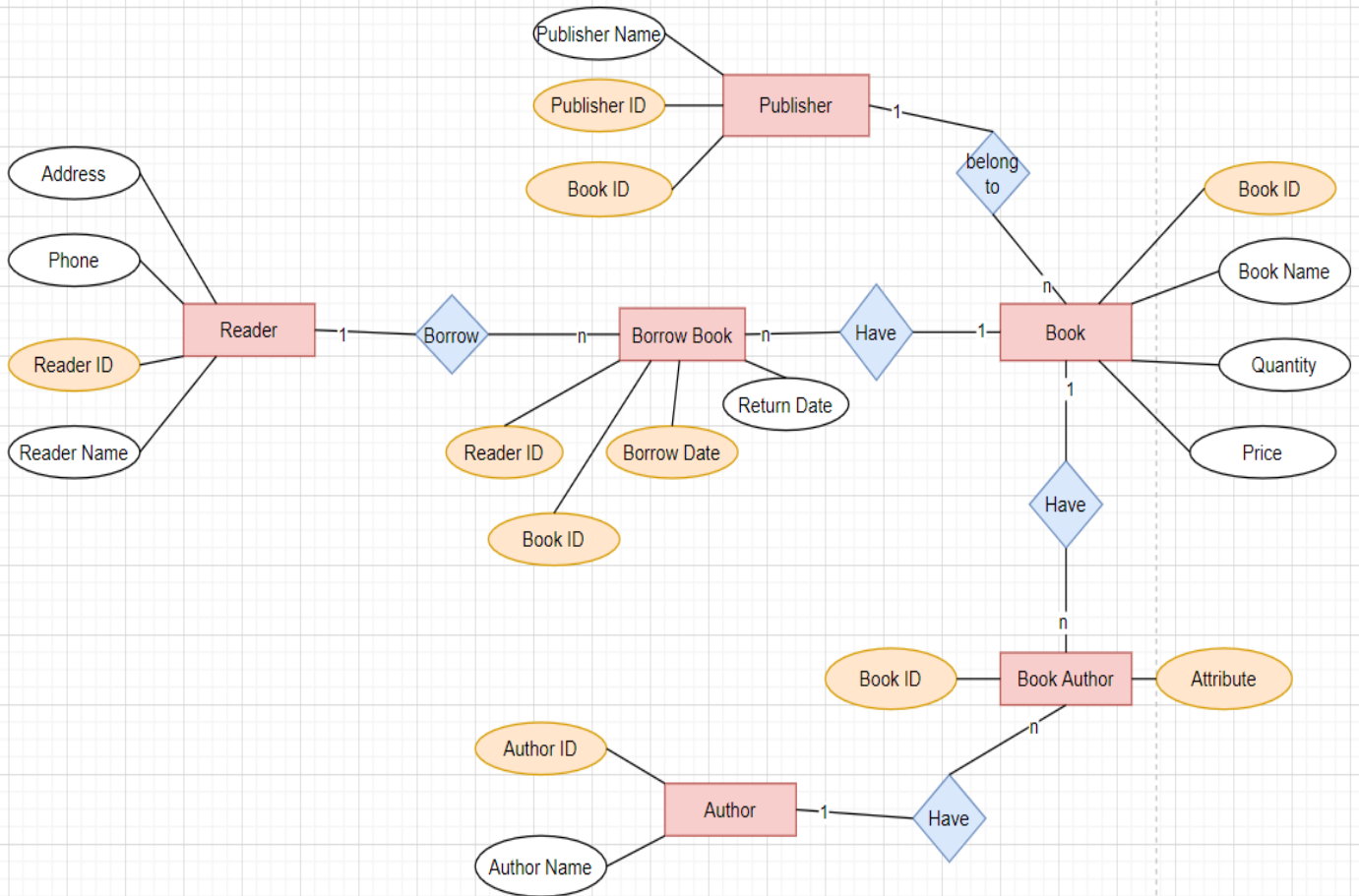
4. Explanation.

- Explain briefly about ERD (entities, their relationship).

+ Many readers can borrow get many books and many books are borrow by many readers. The reader and book have relation (Many-to-many). many books are provided by only one publisher. The reader and book have relation (Many-to-one). Many books are written by many authors who are highly interrelated. The reader and book have relation (Many-to-many).

- Give reasons why ERD is suitable for the system.

+ The constructs used in the ER model can easily be transformed into relational tables.

+ Therefore, the model can be used by the database designer to communicate the design to the end user.

+ Easy conversion for ERD to other data model conversion from ERD diagram to a network or hierarchical data model can easily be accomplished.

5. Physical design.

- **Create database and Create tables.**

Reader:

Field name	Data type	Constraint	Describe
ReaderID	char(10)	Not null, primary key	ID of reader

ReaderName	varchar(50)	Not null	Name of reader
Phone	int	Not null	Phone of reader
Address	char(10)	Not null	Address of reader

Book:

Field name	Data type	Constraint	Describe
BookID	char(10)	Not null, primary key	ID of book
BookName	varchar(50)	Not null	Name of book
Quantity	int	Not null	Quantity book
Price	int		Price of book

BorrowBook:

Field name	Data type	Constraint	Describe
ReaderID	char(10)	Not null, foreign key(ReaderID) references Reader(ReaderID)	ID of reader
BookID	char(10)	Not null, foreign key(BookID) references Book(BookID)	ID of book
BorrowDate	datetime	datetime	Borrow date book
ReturnDate	datetime	datetime	Return date book
(ReaderID, BookID, BorrowDate) is a of BorrowBook table			

Author:

Field name	Data type	Constraint	Describe
AuthorID	varchar(20)	Not null, Primary key	ID of author
AuthorName	varchar(20)	Not null	Name of author

BookAuthor:

Field name	Data type	Constraint	Describe
BookID	char(10)	Not null, foreign key references Book(BookID)	ID of book
AuthorID	varchar(20)	Not null, foreign key references Author(AuthorID)	ID of author
(BookID, AuthorID) primary key is a of BookAuthor table			

Publisher:

Field name	Data type	Constraint	Describe
PublisherID	varchar(20)	Not null	ID of publisher
BookID	char(10)	Not null, foreign key references Book(BookID)	ID of book
PublisherName	varchar(20)	Not null	Name of publisher
(PublisherID, BookID) is a primary key of Publisher table			

+ **Create database LIBRARY.**
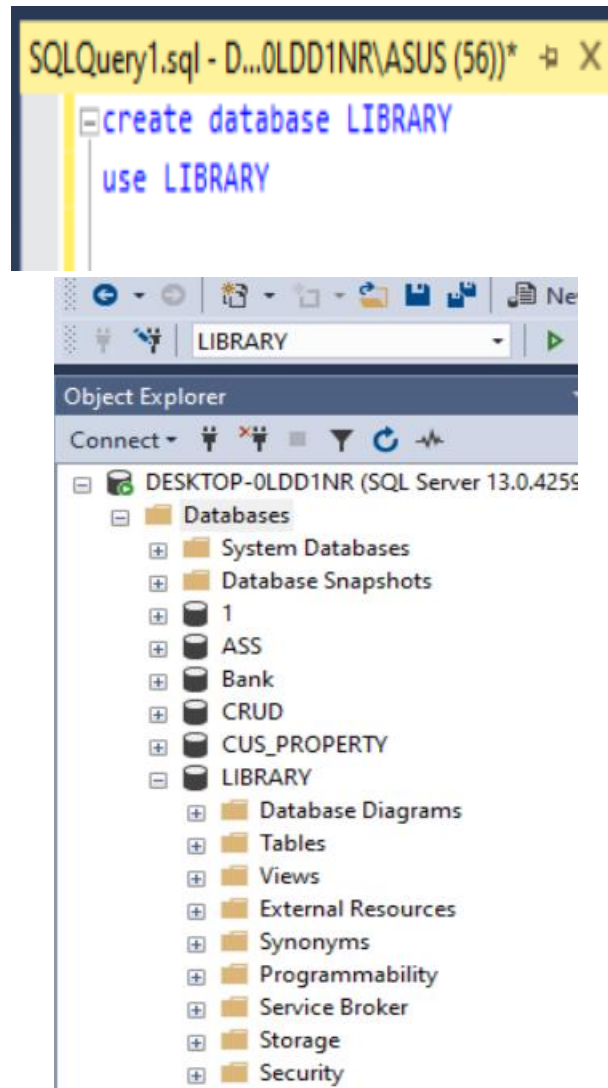
+ **Create tables.**
Create tables [dbo].[Author]

	AuthorID	AuthorName
▶	B001	David J. Schwartz
	B002	T. Harv Eker
	B003	George Samuel Clason
*	NULL	NULL

DESKTOP-0LDD1NR....ARY - dbo.Author

Create tables [dbo].[Book]

DESKTOP-0LDD1NR.LIBRARY - dbo.Book

	BookID	BookName	Quantity	Price
▶	A001	The Magic of T...	50	1
	A002	Secrets of Milli...	60	5
	A003	The Richest Ma...	200	9
*	NULL	NULL	NULL	NULL

Create tables [dbo].[BookAuthor]

DESKTOP-0LDD1NR....- dbo.BookAuthor

	BookID	AuthorID
▶	A001	B001
	A002	B002
	A003	B003
*	NULL	NULL

Create tables [dbo].[BorrowBook]

DESKTOP-0LDD1NR....- dbo.BorrowBook

	ReaderID	BookID	BorrowDate	ReturnDate
▶	C001	A001	2020-01-11 00:00:00.000	2020-01-18 00:00:00.000
	C002	A002	2020-09-10 00:00:00.000	2020-09-17 00:00:00.000
	C003	A003	2020-11-01 00:00:00.000	2020-11-08 00:00:00.000
*	NULL	NULL	NULL	NULL

Create tables [dbo].[Publisher]

DESKTOP-0LDD1NR.L...Y - dbo.Publisher

	PublisherID	BookID	PublisherName
▶	D001	A001	HCM
	D002	A002	HN
	D003	A003	HCM
*	NULL	NULL	NULL

Create tables [dbo].[Reader]

	ReaderID	ReaderName	Phone	Address
▶	C001	VO NHUT HUY	947605978	VINH LONG
	C002	NGUYEN MINH TU	972078173	DONG THAP
	C003	PHAM CAO NGUYEN	981424285	VINH LONG
*	NULL	NULL	NULL	NULL

- Create Database Diagram.
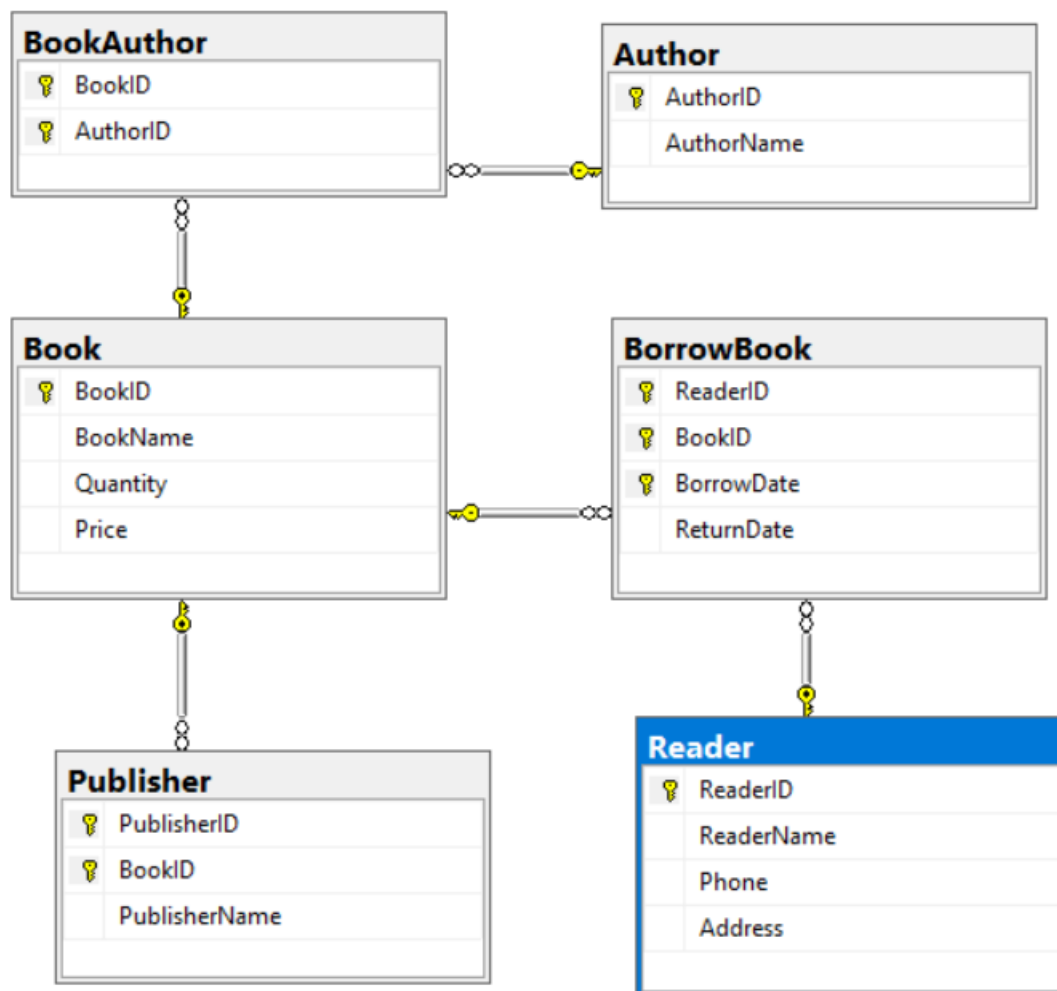
M1 Produce a comprehensive design for a fully functional system which includes interface and output designs, data validations and data normalisation.
II. Data Validation and Normalization.
1.User Interfaces of your system.

APENDIX:

```sql
create database LIBRARY
use LIBRARY
create table Reader
(
        ReaderID char(10) not null primary key,
        ReaderName varchar(50) not null,
        Phone int,
        Address char(10) not null
)
INSERT INTO Reader VALUES ('C001','VO NHUT HUY','0947605978','VINH LONG')
INSERT INTO Reader VALUES ('C002','NGUYEN MINH TU','0972078173','DONG THAP')
INSERT INTO Reader VALUES ('C003','PHAM CAO NGUYEN','0981424285','VINH LONG')
create table Book
(
        BookID char(10) not null primary key,
        BookName varchar(50) not null,
        Quantity int not null,
        Price int
)
INSERT INTO Book VALUES ('A001','The Magic of Thinking BIG','50','1')
INSERT INTO Book VALUES ('A002','Secrets of Millionaire Mind','60','5')
INSERT INTO Book VALUES ('A003','The Richest Man in Babylon','200','9')
create table BorrowBook
(
        ReaderID char(10) foreign key(ReaderID) references Reader(ReaderID),
```

```sql
        BookID char(10) foreign key(BookID) references Book(BookID),
        BorrowDate datetime,
        ReturnDate datetime,
        primary key(ReaderID, BookID, BorrowDate)
)
INSERT INTO BorrowBook VALUES ('C001','A001','01/11/2020','01/18/2020')
INSERT INTO BorrowBook VALUES ('C002','A002','09/10/2020','09/17/2020')
INSERT INTO BorrowBook VALUES ('C003','A003','11/01/2020','11/08/2020')
create table Author
(
        AuthorID varchar(20) not null primary key,
        AuthorName varchar(20) not null,
)
INSERT INTO Author VALUES ('B001','David J. Schwartz')
INSERT INTO Author VALUES ('B002','T. Harv Eker')
INSERT INTO Author VALUES ('B003','George Samuel Clason')
create table BookAuthor
(
        BookID char(10) not null foreign key references Book(BookID),
        AuthorID varchar(20) not null foreign key references Author(AuthorID),
        primary key(BookID, AuthorID)
)
INSERT INTO BookAuthor VALUES ('A001','B001')
INSERT INTO BookAuthor VALUES ('A002','B002')
INSERT INTO BookAuthor VALUES ('A003','B003')
create table Publisher
(
        PublisherID varchar(20) not null,
        BookID char(10) not null foreign key references Book(BookID),
        PublisherName varchar(20) not null,
        primary key (PublisherID, BookID)
)
INSERT INTO Publisher VALUES ('D001','A001','HCM')
INSERT INTO Publisher VALUES ('D002','A002','HN')
INSERT INTO Publisher VALUES ('D003','A003','HCM')
```

References

Wiederhold, G., 1983. *Database design* (Vol. 1077). New York: McGraw-Hill.