



Faculty of engineering - Shoubra  
Benha University  
**Research Project**

|                      |                              |
|----------------------|------------------------------|
| <b>Department</b>    | Electrical Engineering       |
| <b>Division</b>      | Computer Systems Engineering |
| <b>Academic Year</b> | 2019/2020                    |
| <b>Course name</b>   | Database Design              |
| <b>Course code</b>   | ECE323C                      |

**Title: -**

**Library management system**

By:

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| Examiners committee | Signature |
|---------------------|-----------|
|                     |           |
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|                     |           |
|                     |           |



## **Research objectives**

The long-time work could be automated not only in way could anyone understand but also in different ways not just one way I am going to illustrate library management systems which afford some advantage to the manager.

- What is data and what is database
- Database management systems and all its types
- Our example and how it achieved all life cycle of database development
- Schema and SQL code of how tables been built.

Keep tracking all information about books in the library, their cost, total number of books available, the information stored safely in database.



## **Abstract**

Writing some notes all about library management system using MYSQL Workbench to design tables and that by using EER modeling, using relations ship between entities and use SQL script to implement these tables,

I will insert my output and my insert to the project with individual compressed files.it can handle number of books in inventory or it out of stock divide system into three main parts from customer to the business, running some procedures to help us to know info about out business, and some views to display or show data about system in virtual way using concat() and selected and rename it with new column name.



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## **Introduction**

Database is an efficient assortment of information. Databases bolster stockpiling and control of information. Databases make information the board simple. How about we examine not many models.

An online phone catalog would utilize database to store information relating to individuals, telephone numbers, other contact subtleties, and so forth.

Your power specialist organization is clearly utilizing a database to oversee charging , customer related issues, to deal with shortcoming information, and so on.

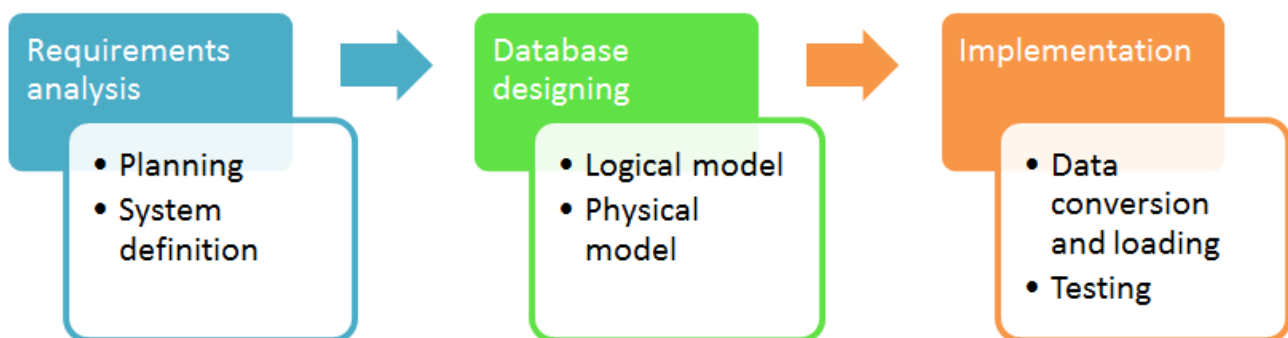
We should likewise consider the Facebook. It needs to store, control and present information identified with individuals, their companions, part exercises, messages, commercials and parcel more.

We can give endless number of guides to use of databases .

Database Design is an assortment of procedures that encourage the planning, advancement, execution and support of big business information the board frameworks. Appropriately planned database is anything but difficult to keep up, improves information consistency and are savvy as far as plate extra room. The database planner chooses how the information components connect and what information must be put away.

The principle destinations of database structuring are to deliver sensible and physical plans models of the proposed database framework.

The coherent model focuses on the information necessities and the information to be put away autonomous of physical contemplations. It doesn't fret about how the information will be put away or where it will be put away genuinely.



The physical information configuration model includes deciphering the coherent plan of the database onto physical media utilizing equipment assets and programming frameworks, for example, database the executive's frameworks (DBMS).

### Database Developer Life Cycle

Database Management System (DBMS) is a collection of programs which enables its users to access database, manipulate data, reporting / representation of data .

### Types of DBMS

#### Two types of Database techniques

1. normalization
2. ER Modeling



## **Literature Review**

### **Domain :**

Library project system to rental and buy books with payment methods and some info about customer and enable us to know if any book out of stock and display book with author and rate or price with language and categories.

### **Customer data**

Will include some entities such as country, city, address, and customer. These entities will have related data to the customer who came to borrow or rent books.

### **Business**

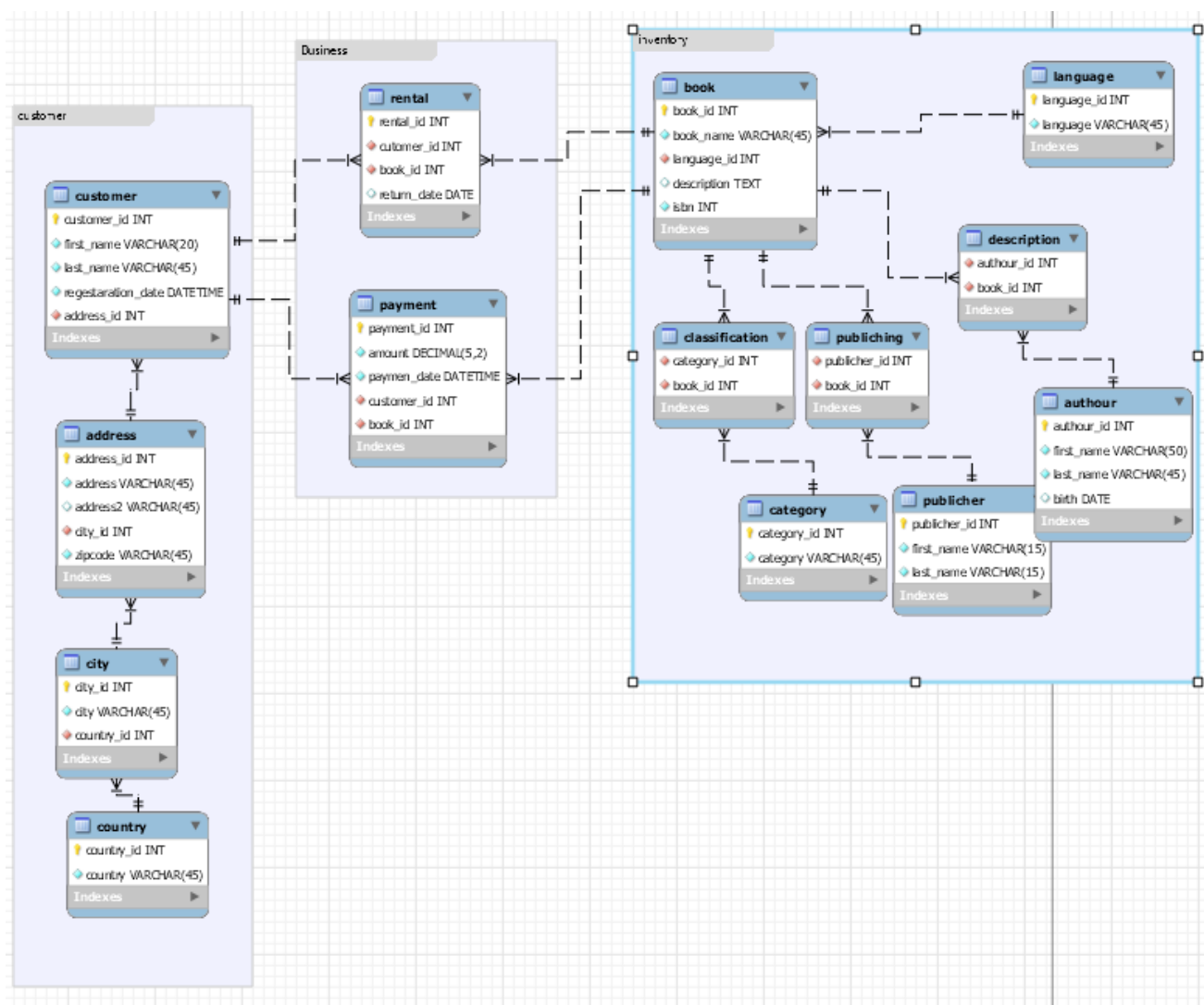
If inventory okay with rental book which want to be borrowed, now we have to include payment method and the staff of library so our entities will include staff, library, rental, payment. For rental we need customer data and inventory, so all attached with each other's.

### **Stock**

Will include some entities such as book, category, language, author ( publisher ), inventory. These entities have book database each book have his own language and author but may be author have many books and so on.

**ER-Molding** : our system is showed below with relation between entities and another section called view. It shows every prime keys for our entities and foreign keys like in customer entity the key prime is customer id and have its own data type which is SMALLINT prime key is also foreign key to another entity like rental it have customer as foreign key with relation one to many.

For the entities relations many to many could not be support any sense in our life so we need to normalize and make more tables, like book and category we have third entity in-between called classification have each prime as foreign to disassembly many to many relationships.







## *Creating database using mysql.*

```
mysql> create table author( authour_id INT NOT NULL, first_name VARCHAR(50) NOT NULL, last_name VARCHAR(45) NOT NULL, birth DATE NULL, PRIMARY KEY (authour_id) );
```

```
mysql> describe authour;
```

| Field      | Type        | Null | Key | Default | Extra |
|------------|-------------|------|-----|---------|-------|
| authour_id | int         | NO   | PRI | NULL    |       |
| first_name | varchar(50) | NO   |     | NULL    |       |
| last_name  | varchar(45) | NO   |     | NULL    |       |
| birth      | date        | YES  |     | NULL    |       |

4 rows in set (0.01 sec)

```
mysql> create table book( book_id INT NOT NULL, book_name VARCHAR(45) NOT NULL, language_id INT NOT NULL, description TEXT NULL, isbn INT NOT NULL, PRIMARY KEY ('book_id') );
```

```
mysql> describe book;
```

| Field       | Type        | Null | Key | Default | Extra |
|-------------|-------------|------|-----|---------|-------|
| book_id     | int         | NO   | PRI | NULL    |       |
| book_name   | varchar(45) | NO   |     | NULL    |       |
| language_id | int         | NO   | MUL | NULL    |       |
| description | text        | YES  |     | NULL    |       |
| isbn        | int         | NO   |     | NULL    |       |

5 rows in set (0.00 sec)

```
mysql> create table category( category_id INT NOT NULL, category VARCHAR(45) NOT NULL, PRIMARY KEY ( category_id) );
```

```
mysql> describe category;
```

| Field       | Type        | Null | Key | Default | Extra |
|-------------|-------------|------|-----|---------|-------|
| category_id | int         | NO   | PRI | NULL    |       |
| category    | varchar(45) | NO   |     | NULL    |       |

2 rows in set (0.00 sec)



```
mysql> create table country ( country_id INT NOT NULL, country VARCHAR(45) NOT NULL, PRIMARY KEY ( country_id ) );
```

```
mysql> describe country;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| country_id | int           | NO   | PRI | NULL    |       |
| country    | varchar(45)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

```
mysql> create table classification ( category_id INT NOT NULL, book_id INT NOT NULL, CONSTRAINT FOREIGN KEY ( book_id ) REFERENCE book( book_id), CONSTRAINT FOREIGN KEY ( category_id ) REFERENCE category ( category_id ) );
```

```
mysql> describe classification;
+-----+-----+-----+-----+-----+-----+
| Field      | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| category_id | int  | NO   | MUL | NULL    |       |
| book_id     | int  | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

```
mysql> create table city ( city_id INT NOT NULL, city VARCHAR(45) NOT NULL, country_id INT NOT NULL, PRIMARY KEY ( city_id ), CONSTRAINT FOREIGN KEY ( country_id ) REFERENCE country (country_id ) );
```

```
mysql> describe city;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| city_id    | int           | NO   | PRI | NULL    |       |
| city       | varchar(45)   | NO   |     | NULL    |       |
| country_id | int           | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

```
mysql> create table customer ( customer_id INT NOT NULL, first_name VARCHAR(20) NOT NULL, last_name VARCHAR(45) NOT NULL, regestration_date DATETIME NOT NULL, address_id INT NOT NULL, PRIMARY KEY ( customer_id ) );
```



```
mysql> describe customer;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| customer_id    | int           | NO   | PRI | NULL    |       |
| first_name     | varchar(20)   | NO   |     | NULL    |       |
| last_name      | varchar(45)   | NO   |     | NULL    |       |
| regestration_date | datetime      | NO   |     | NULL    |       |
| address_id     | int           | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

mysql> create table description ( authour\_id INT NOT NULL, book\_id INT NOT NULL, CONSTRAINT FOREIGN KEY ( authour\_id ) REFERENCE authour ( authour\_id ), CONSTRAINT FOREIGN KEY ( book\_id ) REFERENCE book ( book\_id ) );

```
mysql> describe description;
+-----+-----+-----+-----+-----+-----+
| Field          | Type | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| authour_id     | int  | NO   | MUL | NULL    |       |
| book_id        | int  | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

mysql> create table payment ( payment\_id INT NOT NULL, amount DECIMAL(5,2) NOT NULL, payment\_date DATETIME NOT NULL, customer\_id INT NOT NULL, book\_id INT NOT NULL, PRIMARY KEY ( payment\_id ), CONSTRAINT FOREIGN KEY ( customer\_id ) REFERENCE customer ( customer\_id ), CONSTRAINT FOREIGN KEY ( book\_id ) REFERENCE book ( book\_id ) );

```
mysql> describe payment;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| payment_id     | int           | NO   | PRI | NULL    |       |
| amount         | decimal(5,2)  | NO   |     | NULL    |       |
| payment_date   | datetime      | NO   |     | NULL    |       |
| customer_id    | int           | NO   | MUL | NULL    |       |
| book_id        | int           | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```



```
mysql> create table publisher ( publisher_id INT NOT NULL, first_name  
VARCHAR(15) NOT NULL, last_name VARCHAR(15) NOT NULL, PRIMARY  
KEY ( publisher_id ) );
```

```
mysql> describe publisher;  
+-----+-----+-----+-----+-----+-----+  
| Field          | Type          | Null | Key | Default | Extra |  
+-----+-----+-----+-----+-----+-----+  
| publisher_id   | int           | NO   | PRI | NULL     |       |  
| first_name     | varchar(15)   | NO   |     | NULL     |       |  
| last_name      | varchar(15)   | NO   |     | NULL     |       |  
+-----+-----+-----+-----+-----+-----+  
3 rows in set (0.00 sec)
```

```
mysql> create table publishing ( publisher_id INT NOT NULL, book_id INT NOT  
NULL, CONSTRAINT FOREIGN KEY ( publisher_id ) REFERENCE publisher ( publisher_id ),  
CONSTRAINT FOREIGN KEY ( book_id ) REFERENCE book ( book_id ) );
```

```
mysql> describe publishing;  
+-----+-----+-----+-----+-----+-----+  
| Field          | Type | Null | Key | Default | Extra |  
+-----+-----+-----+-----+-----+-----+  
| publisher_id   | int  | NO   | MUL | NULL     |       |  
| book_id        | int  | NO   | MUL | NULL     |       |  
+-----+-----+-----+-----+-----+-----+  
2 rows in set (0.00 sec)
```

```
mysql> create table rental ( rental_id INT NOT NULL, customer_id INT NOT NULL,  
book_id INT NOT NULL, return_date DATE NULL DEFAULT NULL, PRIMARY  
KEY ( rental_id ), CONSTRAINT FOREIGN KEY ( book_id ) REFERENCE book ( book_id ),  
CONSTRAINT FOREIGN KEY ( customer_id ) REFERENCE customer ( customer_id ) );
```

```
mysql> describe rental;  
+-----+-----+-----+-----+-----+-----+  
| Field          | Type | Null | Key | Default | Extra |  
+-----+-----+-----+-----+-----+-----+  
| rental_id      | int  | NO   | PRI | NULL     |       |  
| customer_id    | int  | NO   | MUL | NULL     |       |  
| book_id        | int  | NO   | MUL | NULL     |       |  
| return_date    | date | YES  |     | NULL     |       |  
+-----+-----+-----+-----+-----+-----+  
4 rows in set (0.00 sec)
```



```
mysql> create table address ( address_id INT NOT NULL, address VARCHAR(45)
NOT NULL, address 2 VARCHAR(45) NULL, zipcode VARCHAR(45) NOT NULL,
PRIMARY KEY ( address_id ), CONSTRAINT FOREIGN KEY ( city_id )
REFERENCES city ( city_id ) ON DELETE NO ACTION ON UPDATE NO
ACTION );
```

```
mysql> describe address;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| address_id | int           | NO   | PRI | NULL    |       |
| address     | varchar(45)   | NO   |     | NULL    |       |
| address2    | varchar(45)   | YES  |     | NULL    |       |
| city_id     | int           | NO   | MUL | NULL    |       |
| zipcode     | varchar(45)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> create table language (language_id INT NOT NULL, language
VARCHAR(45) NOT NULL, RPIMARY_KEY(language_id) );
```

```
mysql> describe language;
+-----+-----+-----+-----+-----+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| language_id | int           | NO   | PRI | NULL    |       |
| language     | varchar(45)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

```
mysql> insert into language values (1, 'English' ), (2, 'Arabic'), (3, 'Italian'), (4,
'French'), (5, 'German' );
```

```
mysql> select *from language ;
+-----+-----+
| language_id | language |
+-----+-----+
| 1           | English  |
| 2           | Arabic   |
| 3           | Italian  |
| 4           | French   |
| 5           | German   |
+-----+-----+
5 rows in set (0.00 sec)
```



mysql> insert into country values (1, 'Egypte'), (2, 'Libya'), (3, 'Algeria'), (4, 'Sudan'), (5, 'SAUDI ARABIA');

```
mysql> select * from country;
+-----+-----+
| country_id | country |
+-----+-----+
|          1 | Egypte  |
|          2 | Libya   |
|          3 | Algeria |
|          4 | Sudan   |
|          5 | SAUDI ARABIA |
+-----+-----+
5 rows in set (0.00 sec)
```

mysql> insert into city values (100, 'Alexandria', 1), (101, 'Cairo', 1), (103, 'Tripoli', 2), (104, 'Misrata', 2), (105, 'Oran', 3), (106, 'Sétif', 3), (107, 'Tébessa', 3), (108, 'Omdurman', 4), (109, 'Kassala', 4), (110, 'Median', 5), (111, 'taif', 5);

```
mysql> select * from city;
+-----+-----+-----+
| city_id | city       | country_id |
+-----+-----+-----+
|      100 | Alexandria |          1 |
|      101 | Cairo      |          1 |
|      103 | Tripoli    |          2 |
|      104 | Misrata    |          2 |
|      105 | Oran       |          3 |
|      106 | Sétif      |          3 |
|      107 | Tébessa    |          3 |
|      108 | Omdurman   |          4 |
|      109 | Kassala    |          4 |
|      110 | Median     |          5 |
|      111 | taif       |          5 |
+-----+-----+-----+
11 rows in set (0.00 sec)
```

mysql> insert into category values (1, 'Non-fiction'), (2, 'Biographies'), (3, 'Fiction'), (4, 'Everybody'), (5, 'Reference');

```
mysql> select * from category;
+-----+-----+
| category_id | category |
+-----+-----+
|          1 | Non-fiction |
|          2 | Biographies |
|          3 | Fiction     |
|          4 | Everybody   |
|          5 | Reference   |
+-----+-----+
5 rows in set (0.00 sec)
```





mysql> insert into book values (1, 'Between the World and Me', 2, "publisher Spiegel & Grau letter to teenage son about the feelings and symbolism", 15987),  
(2, 'Silent Spring', 2, "documenting the adverse environmental effects caused by the indiscriminate use of pesticides publisher same author and Carson", 15789),  
(3, 'The Immortal Life of Henrietta Lacks', 2, "publisher Crown Publishing Group and help public understanding of topics in science", 18798),  
(4, 'Bury My Heart at Wounded Knee', 2, "published in 2007 and it an indian history of the american west", 87951),  
(5, 'Italian Days', 3, "journey to Italy written in a culture provide a good life meaning", 98732),  
(6, 'صفحات من تحريتي', 2, "المكتب المصري الحديث هو الناشر الذي يحكي فيه قصة عثمان احمد عثمان مع الرئيس السادات", 12356);

| book_id | book_name                            | language_id | description  | isbn  |
|---------|--------------------------------------|-------------|--|-------|
| 1       | Between the World and Me             | 2           | publisher Spiegel & Grau letter to teenage son about the feelings and symbolism              | 15987 |
| 2       | Silent Spring                        | 2           | documenting the adverse environmental effects caused by the indiscriminate use of pesticides | 15789 |
| 3       | The Immortal Life of Henrietta Lacks | 2           | publisher Crown Publishing Group and help public understanding of topics in science          | 18798 |
| 4       | Bury My Heart at Wounded Knee        | 2           | published in 2007 and it an indian history of the american west                              | 87951 |
| 5       | Italian Days                         | 3           | journey to Italy written in a culture provide a good life meaning                            | 98732 |
| 6       | صفحات من تحريتي                      | 2           | المكتب المصري الحديث هو الناشر الذي يحكي فيه قصة عثمان احمد عثمان مع السادات                 | 12356 |

My console does not support arabic char so I used mysql workbench to display this result.

mysql> insert into author values (1, 'Ta-Nehisi', 'Coates', '2015-07-14'), (2, 'Rachel', 'Carson', '1962-02-05'), (3, 'Rebecca', 'Skloot', '2010-02-02'), (4, 'Dee', 'Brawn', '1964-02-09'), (5, 'Barbara', 'Harrison', '1989-08-11'), (6, 'عثمان', 'احمد', '2012-08-02');

|   | author_id | first_name | last_name | birth      |
|---|-----------|------------|-----------|------------|
| ▶ | 1         | Ta-Nehisi  | Coates    | 2015-07-14 |
|   | 2         | Rachel     | Carson    | 1962-02-05 |
|   | 3         | Rebecca    | Skloot    | 2010-02-02 |
|   | 4         | Dee        | Brawn     | 1964-02-09 |
|   | 5         | Barbara    | Harrison  | 1989-08-11 |
|   | 6         | عثمان      | احمد      | 2012-08-02 |

mysql> insert into description values (1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6);

```
mysql> select * from description;
+-----+-----+
| author_id | book_id |
+-----+-----+
| 1         | 1       |
| 2         | 2       |
| 3         | 3       |
| 4         | 4       |
| 5         | 5       |
| 6         | 6       |
+-----+-----+
6 rows in set (0.00 sec)
```



mysql> insert into classification values (1, 1), (1, 2), (2, 3), (2, 6);

```
mysql> select * from classification;
+-----+-----+
| category_id | book_id |
+-----+-----+
|          1 |        1 |
|          1 |        2 |
|          2 |        3 |
|          2 |        6 |
+-----+-----+
4 rows in set (0.00 sec)
```

mysql> insert into customer values (1, 'Ahmed', 'Ali', '2020-07-08 04:57:30', 1), (2, 'Mohamed', 'Ahmed', '2020-07-08 04:58:30', 2), (3, 'Sheksh-alhamed', 'Modee', '2020-07-08 05:57:30', 3), (4, 'Mohamed', 'Abdallah', '2020-07-08 02:57:30', 4), ('Marawan', 'bee', '2020-08-03 04:57:30', 4), .....(10, 'mash', 'teran', '2020-07-08 04:57:30', 1);

```
mysql> select *from customer;
+-----+-----+-----+-----+-----+
| customer_id | first_name | last_name | regestartation_date | address_id |
+-----+-----+-----+-----+-----+
|          1 | Ahmed     | Ali      | 2020-07-08 04:57:30 |          1 |
|          2 | Mohamed   | Ahmed    | 2020-07-08 04:58:30 |          2 |
|          3 | Sheksh-alhamed | Modee    | 2020-07-08 05:57:30 |          3 |
|          4 | Mohamed   | Abdallah | 2020-07-08 02:57:30 |          4 |
|          5 | Marawan   | bee      | 2020-08-03 04:57:30 |          4 |
|          6 | Asma      | Akera    | 2020-07-08 04:57:30 |          2 |
|          7 | teba      | Akram    | 2020-07-08 04:57:30 |          1 |
|          8 | lyla      | talal    | 2020-07-08 04:57:30 |          3 |
|          9 | loma      | sanki    | 2020-07-08 04:57:30 |          1 |
|         10 | mash      | teran    | 2020-07-08 04:57:30 |          1 |
+-----+-----+-----+-----+-----+
10 rows in set (0.00 sec)
```

mysql> insert into address values (1,'90th New Cairo',NULL,101, 98765), (2,'909 Marker ELkahmmes',NULL,109, 18265), (3,'70th Tahrir Squar',NULL,108, 13862), (4,'87 Trablos Media',NULL,107, 98763),(5,'12 Madena Monora',NULL,106, 98764),(6,'7 Algerai Deseret',NULL,105, 38123), (7,'232 Tuniess Alab',NULL,104, 10002),(8,'103 villa alaen dubai',NULL,103, 12356),(9,'4th block khaled albelwaleed',NULL,100, 65432), (10,'18- oraby street',NULL,101, 91123);





```
mysql> select *from address;
```

| address_id | address                      | address2 | city_id | zipcode |
|------------|------------------------------|----------|---------|---------|
| 1          | 90th New Cairo               | NULL     | 101     | 98765   |
| 2          | 909 Marker ELkahmmes         | NULL     | 109     | 18265   |
| 3          | 70th Tahrir Squar            | NULL     | 108     | 13862   |
| 4          | 87 Trablos Media             | NULL     | 107     | 98763   |
| 5          | 12 Madena Monora             | NULL     | 106     | 98764   |
| 6          | 7 Algerai Deseret            | NULL     | 105     | 38123   |
| 7          | 232 Tuniess Alab             | NULL     | 104     | 10002   |
| 8          | 103 villa alaen dubai        | NULL     | 103     | 12356   |
| 9          | 4th block khaled albelwaleed | NULL     | 100     | 65432   |
| 10         | 18- oraby street             | NULL     | 101     | 91123   |

10 rows in set (0.00 sec)

```
mysql> insert into payment values (1, '5.30', '2020-07-22 12:30:12', 1, 1), (2, '4.20',  
'2020-08-20 10:30:12', 2, 2), (3, '3.20', '2020-07-19 11::12', 1, 2), (5, '2.50', '2020-07-  
17 13:30:12', 3, 4), (6, '3.40', '2020-07-16 22:30:12', 4, 3), (7, '8.30', '2020-07-15  
14:30:12', 10, 6), (8, '2.20', '2020-07-14 15:30:12', 9, 3), (9, '7.12', '2020-07-13  
17:30:12', 8, 2), (10, '13.27', '2020-07-13 20:30:12', 2, 5);
```

```
mysql> select * from payment;
```

| payment_id | amount | paymen_date         | customer_id | book_id |
|------------|--------|---------------------|-------------|---------|
| 1          | 5.30   | 2020-07-22 12:30:12 | 1           | 1       |
| 2          | 4.20   | 2020-08-20 10:30:12 | 2           | 2       |
| 3          | 3.20   | 2020-07-19 11:12:00 | 1           | 2       |
| 5          | 2.50   | 2020-07-17 13:30:12 | 3           | 4       |
| 6          | 3.40   | 2020-07-16 22:30:12 | 4           | 3       |
| 7          | 8.30   | 2020-07-15 14:30:12 | 10          | 6       |
| 8          | 2.20   | 2020-07-14 15:30:12 | 9           | 3       |
| 9          | 7.12   | 2020-07-13 17:30:12 | 8           | 2       |
| 10         | 13.27  | 2020-07-13 20:30:12 | 2           | 5       |

9 rows in set (0.00 sec)

```
mysql> insert into rental values (1, 1, 1, '2020-08-07 05:45:12'), (2, 2, 1, '2020-08-07  
05:45:12'), (3, 3, 1, '2020-08-07 05:45:12'), (4, 4, 1, '2020-08-07 05:45:12'), (5, 5, 2,  
'2020-08-07 05:45:12'), (6, 6, 3, '2020-08-07 05:45:12'), (7, 7, 4, '2020-08-07  
05:45:12'), (8, 8, 6, '2020-08-07 05:45:12'), (9, 9, 6, '2020-08-07 05:45:12');
```



```
mysql> select * from rental;
```

| rental_id | customer_id | book_id | return_date |
|-----------|-------------|---------|-------------|
| 1         | 1           | 1       | 2020-08-07  |
| 2         | 2           | 1       | 2020-08-07  |
| 3         | 3           | 1       | 2020-08-07  |
| 4         | 4           | 1       | 2020-08-07  |
| 5         | 5           | 2       | 2020-08-07  |
| 6         | 6           | 3       | 2020-08-07  |
| 7         | 7           | 4       | 2020-08-07  |
| 8         | 8           | 6       | 2020-08-07  |
| 9         | 9           | 6       | 2020-08-07  |

```
9 rows in set (0.00 sec)
```

```
mysql> insert into publisher values (1, 'Media', 'Arena'), (2, 'Mark', 'Aleson'), (3, 'Meta', 'Dwate'), (4, 'Arnode', 'Zwaeky'), (5, 'Matewte', 'Bele'), (6, 'Modern', 'Procdution');
```

```
mysql> select * from publisher;
```

| publisher_id | first_name | last_name  |
|--------------|------------|------------|
| 1            | Media      | Arena      |
| 2            | Mark       | Aleson     |
| 3            | Meta       | Dwate      |
| 4            | Arnode     | Zwaeky     |
| 5            | Matewte    | Bele       |
| 6            | Modern     | Procdution |

```
6 rows in set (0.00 sec)
```

```
mysql> insert into publiching values (1,1), (2,2), (3,3), (4,4), (5,5), (6,6);
```

```
mysql> select * from publiching;
```

| publisher_id | book_id |
|--------------|---------|
| 1            | 1       |
| 2            | 2       |
| 3            | 3       |
| 4            | 4       |
| 5            | 5       |
| 6            | 6       |

```
6 rows in set (0.00 sec)
```



## Test Queries and Reportes

1. Add column called book type in cutomer table

```
mysql> alter table customer add book_type VARCHAR(11) NULL;
```

```
mysql> describe cutomer;
```

| Field               | Type        | Null | Key | Default | Extra |
|---------------------|-------------|------|-----|---------|-------|
| customer_id         | int         | NO   | PRI | NULL    |       |
| first_name          | varchar(20) | NO   |     | NULL    |       |
| last_name           | varchar(45) | NO   |     | NULL    |       |
| regestartation_date | datetime    | NO   |     | NULL    |       |
| address_id          | int         | NO   | MUL | NULL    |       |
| book_type           | varchar(11) | YES  |     | NULL    |       |

6 rows in set (0.00 sec)

```
mysql> select * from cutomer;
```

(after I update the null value inseted by default into the book type column);

```
mysql> select * from customer;
```

| customer_id | first_name     | last_name | regestartation_date | address_id | book_type   |
|-------------|----------------|-----------|---------------------|------------|-------------|
| 1           | Ahmed          | Ali       | 2020-07-08 04:57:30 | 1          | Non-fiction |
| 2           | Mohamed        | Ahmed     | 2020-07-08 04:58:30 | 2          | Non-fiction |
| 3           | Sheksh-alhamed | Modee     | 2020-07-08 05:57:30 | 3          | Non-fiction |
| 4           | Mohamed        | Abdallah  | 2020-07-08 02:57:30 | 4          | Comedy      |
| 5           | Marawan        | bee       | 2020-08-03 04:57:30 | 4          | Comedy      |
| 6           | Asma           | Akera     | 2020-07-08 04:57:30 | 2          | Everybody   |
| 7           | teba           | Akram     | 2020-07-08 04:57:30 | 1          | Everybody   |
| 8           | lyla           | talal     | 2020-07-08 04:57:30 | 3          | Reference   |
| 9           | loma           | sanki     | 2020-07-08 04:57:30 | 1          | Reference   |
| 10          | mash           | teran     | 2020-07-08 04:57:30 | 1          | Reference   |

10 rows in set (0.00 sec)

2. Display cutomer name who took the book of type comedy.

```
Mysql> select first_name, last_name from customer where book_type =  
'everybody';
```

| first_name | last_name |
|------------|-----------|
| Asma       | Akera     |
| teba       | Akram     |

2 rows in set (0.00 sec)



3. Amount of money in the library bank

```
mysql> select sum(amount) from payment;
```

```
+-----+  
| sum(amount) |  
+-----+  
|      49.49  |  
+-----+
```

4. We can know the numebr of books availabe in the library number of books rented with cutomer id and keep tracking his address and so on.



## References

- [1] Web Reference: [www.java-source.net/open-source/persistence](http://www.java-source.net/open-source/persistence)
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- [4] MODERN DATABASE MANAGEMENT Tenth Edition by Jeffrey A. Hoffer, V. Ramesh, Heikki Topi.
- [5] MySQL (3rd Edition) 3rd Edition by Joel Murach