CC4002NA

Information Systems

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1. Proposal

This project is a database of an Automobile Company which sells 2-wheelers. To make the database as effective and easily understandable, it has been divided into five different tables. Each table holds a specific type of information.

Due to the large amount of information to be stored about each and every purchase, storing the information in ledgers was a hard task and was also very hard to manage. The main aim of this project is to make information regarding sales easier to manage for the company. It also holds information regarding each product in the inventory such as price, model year, etc. The target audience of this project are the Automobile Company and their customers. Students and learners who are new to MySQL or other DBMSs could also find this project useful to help them understand MySQL and its coding syntax. A basic computer system was used as hardware and XAMPP Control Panel software, along with Shell, was used to create this project. In this project, first a database was created which holds five tables, each table storing a particular type of information regarding the company and its activities.

2. Introduction

My SQL is an open-source relational database management system. It was developed by MySQL AB but is currently owned by Oracle Corporation. (Anon., 2016) Due to MySQL having easy to learn syntax, it is very useful to people using a DBMS Software for the first time. (Schwartz, 2008) (PAdhy, 2011)

I have created a database for an Automobile Company which sells two-wheelers. The database was needed as it was very difficult to store the sales and other activities of the company through written ledgers, etc. Also it was very easy to lose the information in such format. The project allows the user to easily store and modify the information.

The database is named ‘MotorcycleCompany’. It has five tables named: Manufacturer, Model, Dealership, Discount and Register. The integer ID has been used as the primary key for the table ‘Manufacturer’ and as a foreign key for all the rest of the tables. Each table contains a certain type of information related to the activities and products of the company.

The table ‘Manufacturer’ contains information regarding the ID, manufacturer and the country of manufacturer. The manufacturer name has been set to ‘Yamaha’ , ‘Honda’ , ‘Bajaj’ , ‘KTM’ and ‘Royal Enfield’ whereas their corresponding values in the column country has been set to ‘Japan’ , ‘Japan’ , ‘India’ , ‘Austria’ and ‘India’. The ID has been used as Primary Key in this column and there are no foreign keys. (Anon., 2017)

The second table ‘Model’ contains information regarding the Symbol No, Model, Price and Year. The model column has been set to ‘FZ25’ , ‘CRF 250 L’ , ‘NS 200’ , ‘Duke 250’ and ‘Bullet 350’ while their corresponding values in the column price has been set to ‘350000’ , ‘950000’ , ‘296000’ , ‘560000’ and ‘440000’ whereas the column year has been set to ‘2017’ , ‘2017’ , ‘2017’ , ‘2017’ and ‘2016’. SNo has been

used as the Primary Key while ID from the table Manufacturer has been used as Foreign Key. (Lin, 2013)

The third table ‘Dealership’ contains information regarding the dealership and its location. The column dealership has been set to ‘MAW Enterprises’ , ‘Jyoti Group’ , ‘Hansraj Hulaschand’ , ‘Hansraj Hulaschand’ and ‘Dugar Brothers’ while their correspondents in the column location has been set to ‘Teku’ , ‘Teku’ , ‘Teku’ , ‘Naxal’ and ‘Naxal’ . SNo is used as the Primary Key and ID from Manufacturer is used as Foreign Key.

The fourth table ‘Discount’ contains information regarding the discount offers and their validity. The column discount has been set to ‘5%’ , ‘10%’ , ‘15%’ , ‘20%’ and ‘20%’ while the validity has been set to ‘24/12./2018’ , ‘10/10/2018’ , ‘4/7/2018’ , ‘7/9/2018’ and ‘4/10/2018’. Sno is used as Primary Key and ID from manufacturer is used as Foreign Key.

The fifth table ‘Register’ contains information about the customers and their various purchases. The column customer has been set to ‘Chris Brown’ , ‘Kurt Cobain’ , ‘Samragyee RL Shah’ , ‘Ninjas Hyper’ and ‘The Myth’ while their corresponding values in the column purchase has been set to ‘FZ25’ , ‘CRF 250 L’ , ‘NS 200’ , ‘Duke 250’ and ‘Bullet 350’. SNo is used as Primary Key and ID from manufacturer is the Foreign Key.

3. Discussion and Analysis

The program was developed using MySQL. I used MySQL through ‘XAMPP Control Panel’ using ‘Shell’. In MySQL, information is stored in a table. Since a table consists of rows and columns, each row in the table represents a collection of related values. Tables hold information to be represented in the database.

So as to create relation between the various tables, the concept of primary and foreign key has been used in the program. Primary key is the column which uniquely identifies the row. All primary key fields have a different value in the same table. A table should have primary key. Foreign key is a column whose value refers to the primary key of another table. (Pachev, 2007) (Raval, 2013)

Parent and child table definition is always between two tables which have a relationship between them. The parent table is the table whose primary key is referenced as another table’s foreign key. The table having such foreign key is the child table. (Auer, 2007). (Gilifillan, 2003)

A DBMS is a system software for creating and managing databases. (Silberschatz, 2016) DBMS provides users and programmers a systematic way to create, retrieve, update and manage data. The main objectives for using DBMS are:

A) Data Availability

The data availability is responsible for the cost performance and the query update. Availability functions make the database available to users help in defining and creating a database and using the data stored in the database.

B) Data Integrity

The data integrity provides protection for the existence of the database and maintaining quality of the database.

C) Data Independence

It provides two types of data independences. First, a physical data independence program, which remains unaffected from the changes in the storage structure or access method, and the second, logical data independence program, which remains unaffected from the changes in the schema. (Anon., 2016)

4. Model

Table A) Manufacturer

The syntax used to create the table was:

```
+--------------+-----------------------------------
----+
| Table        | Create Table
    |
+--------------+-----------------------------------
----+
| Manufacturer | CREATE TABLE `manufacturer` (
  `ID` int(11) NOT NULL,
  `Manufacturer` varchar(255) DEFAULT NULL,
  `Country` varchar(255) DEFAULT NULL,
  PRIMARY KEY (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |
+--------------+-----------------------------------
----+
1 row in set (0.01 sec)
```

The description of the table is as shown below:

```
MariaDB [MotorcycleCompany]> describe Manufacturer;
+--------------+--------------+------+-----+---------+-------+
| Field        | Type         | Null | Key | Default | Extra |
+--------------+--------------+------+-----+---------+-------+
| ID           | int(11)      | NO   | PRI | NULL    |       |
| Manufacturer | varchar(255) | YES  |     | NULL    |       |
| Country      | varchar(255) | YES  |     | NULL    |       |
+--------------+--------------+------+-----+---------+-------+
```

The table is:

```
+----+-----------------+-----------+
| ID | Manufacturer    | Country   |
+----+-----------------+-----------+
|  1 |  Yamaha         |  Japan    |
|  2 |  Honda          |  Japan    |
|  3 |  Bajaj          |  India    |
|  4 |  KTM            |  Austria  |
|  5 |  Royal Enfield  |  India    |
+----+-----------------+-----------+
```

Table B) Model

The table was created using the following syntax:

```
| Model | CREATE TABLE `model` (
  `SNo` int(11) NOT NULL,
  `Model` varchar(255) DEFAULT NULL,
  `Price` int(11) DEFAULT NULL,
  `Year` int(11) DEFAULT NULL,
  `ID` int(11) DEFAULT NULL,
  PRIMARY KEY (`SNo`),
  KEY `ID` (`ID`),
  CONSTRAINT `model_ibfk_1` FOREIGN KEY (`ID`) REFERENCES `manufacturer` (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |
```

The description of the table is as given below:

Field	Type	Null	Key	Default	Extra
SNo	int(11)	NO	PRI	NULL	
Model	varchar(255)	YES		NULL	
Price	int(11)	YES		NULL	
Year	int(11)	YES		NULL	
ID	int(11)	YES	MUL	NULL	

The table is:

SNo	Model	Price	Year	ID
1	FZ25	350000	2017	1
2	CRF 250 L	950000	2017	2
3	NS 200	296000	2017	3
4	Duke 250	560000	2017	4
5	Bullet 350	440000	2016	5

Table C) Dealership

The table was created using the following syntax:

```
| Dealership | CREATE TABLE `dealership` (
  `SNo` int(11) NOT NULL,
  `Dealership` varchar(255) DEFAULT NULL,
  `Location` varchar(255) DEFAULT NULL,
  `ID` int(11) DEFAULT NULL,
  PRIMARY KEY (`SNo`),
  KEY `ID` (`ID`),
  CONSTRAINT `dealership_ibfk_1` FOREIGN KEY (`ID`) REFERENCES `manufacturer` (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |
```

The description of the table is as given below:

Field	Type	Null	Key	Default	Extra
SNo	int(11)	NO	PRI	NULL	
Dealership	varchar(255)	YES		NULL	
Location	varchar(255)	YES		NULL	
ID	int(11)	YES	MUL	NULL	

The table is:

SNo	Dealership	Location	ID
1	MAW Enterprises	Teku	1
2	Jyoti Group	Teku	2
3	Hansraj Hulaschand	Teku	3
4	Hansraj Hulaschand	Naxal	4
5	Dugar Brothers	Naxal	5

Table D) Discount

The table was created using the following syntax:

```
| Discount | CREATE TABLE `discount` (
  `SNo` int(11) NOT NULL,
  `Discount` varchar(255) DEFAULT NULL,
  `Validity` date DEFAULT NULL,
  `ID` int(11) DEFAULT NULL,
  PRIMARY KEY (`SNo`),
  KEY `ID` (`ID`),
  CONSTRAINT `discount_ibfk_1` FOREIGN KEY (`ID`) REFERENCES `manufacturer` (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |
```

The description of the table is as given below:

Field	Type	Null	Key	Default	Extra
SNo	int(11)	NO	PRI	NULL	
Discount	varchar(255)	YES		NULL	
Validity	date	YES		NULL	
ID	int(11)	YES	MUL	NULL	

The table is:

SNo	Discount	Validity	ID
1	5%	2018-12-24	1
2	10%	2018-10-10	2
3	15%	2018-07-04	3
4	20%	2018-09-07	4
5	20%	2018-10-04	5

Table E) Register

The table was create using the following syntax:

```
| Register | CREATE TABLE `register` (
  `SNo` int(11) NOT NULL,
  `Customer` varchar(255) DEFAULT NULL,
  `Purchase` varchar(255) DEFAULT NULL,
  `ID` int(11) DEFAULT NULL,
  PRIMARY KEY (`SNo`),
  KEY `ID` (`ID`),
  CONSTRAINT `register_ibfk_1` FOREIGN KEY (`ID`) REFERENCES `manufacturer` (`ID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 |
```

The description of the table is as given below:

Field	Type	Null	Key	Default	Extra
SNo	int(11)	NO	PRI	NULL	
Customer	varchar(255)	YES		NULL	
Purchase	varchar(255)	YES		NULL	
ID	int(11)	YES	MUL	NULL	

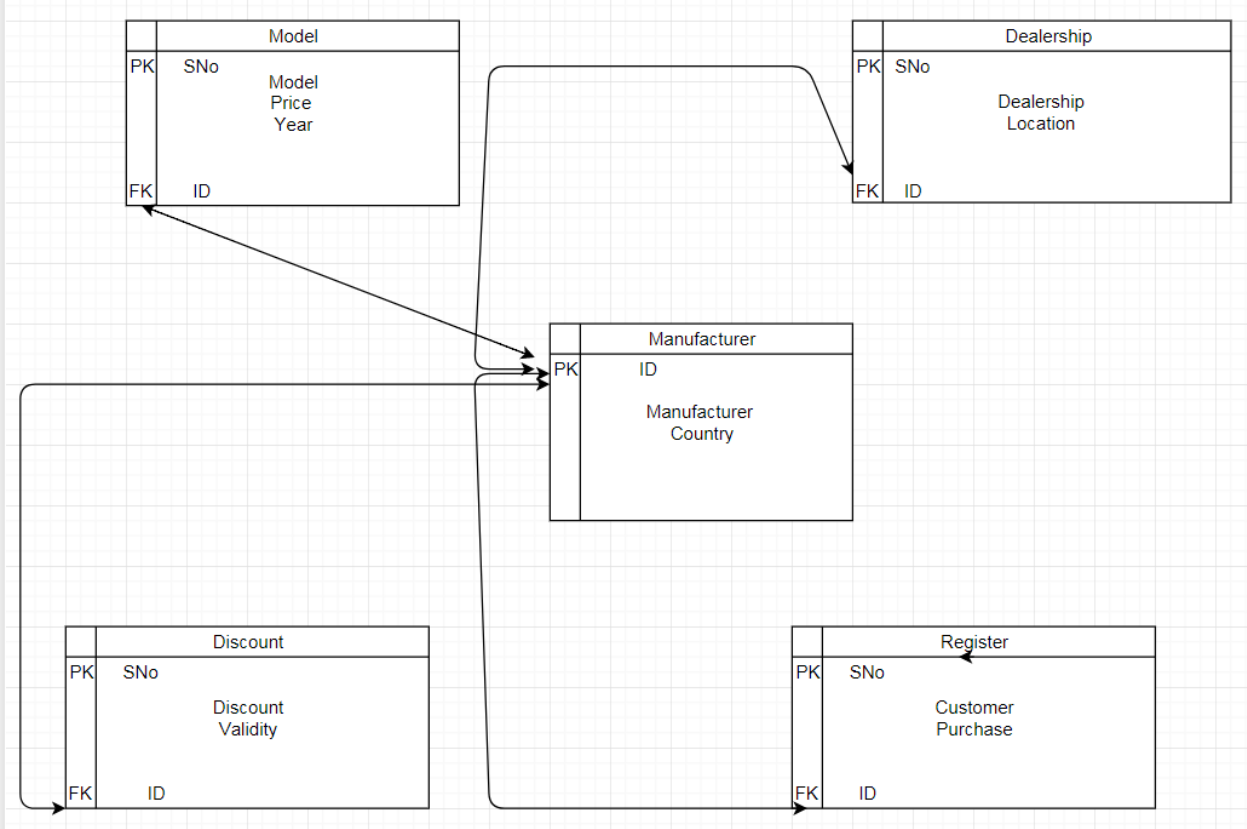
The table is:

SNo	Customer	Purchase	ID
1	Chris Brown	FZ25	1
2	Kurt Cobain	CRF 250 L	2
3	Samragyee RL Shah	NS 200	3
4	Ninjas Hyper	Duke 250	4
5	The Myth	Bullet 350	5

The database that I have created has been named ‘MotorcycleCompany’, it stores five tables named ‘Manufacturer’, ‘Model’, ‘Dealership’, ‘Discount’ and ‘Register’. The primary key for the table ‘Manufacturer’ has been set to ‘ID’ which has been used as the foreign key for the rest four tables.

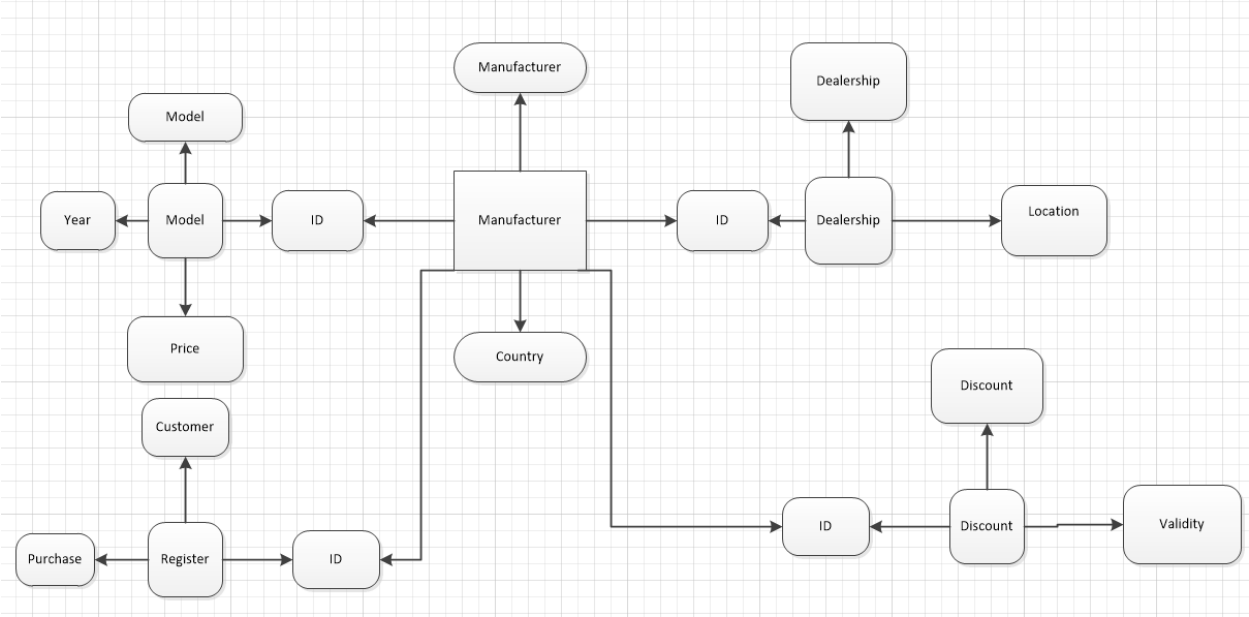
Relational Diagram

(Bagui, 2003)



Entity Relational Diagram

An entity relationship Diagram (ERD) is a diagram which show the relationships of entity sets stored in a database. (Riordan, 2005) ER diagrams illustrate the logical structure of databases. (Anon., 2015).



5. Data Dictionary

Table A) Manufacturer

Entity Name	Entity Description	Column Name	Column Description	Data Type	Length	Primary Key	Foreign Key	Nullable	Unique
Manufacturer	A manufacturer is the one that creates the products.	ID	ID for the manufacturer for unique identification.	INT		True	False	False	True
		Manufacturer	The name of the various manufacturers.	VARCHAR	255	False	False	False	False
		Country	The country to which the manufacturer belongs.	VARCHAR	255	False	False	False	False

Table B) Model

Entity Name	Entity Description	Column Name	Column Description	Data Type	Length	Primary Key	Foreign Key	Nullable	Unique
Model	The specific model designed by the manufacturer.	SNo	Symbol number for specific model.	x		True	False	False	True
		Model	The name of the model.	VARCHAR	255	False	False	False	True
		Price	The price of the model.	INT		False	False	False	False
		Year	The model year.	INT		False	False	False	False
		ID	ID of manufacturer.	INT		False	True	False	True

Table C) Dealership

Entity Name	Entity Description	Column Name	Column Description	Data Type	Length	Primary Key	Foreign Key	Nullable	Unique
Dealership	The selling party.	SNo	Symbol number for specific dealer.	INT		True	False	False	True
		Dealership	The one who sells the two-wheelers.	VARCHAR	255	False	False	False	False
		Location	Location of the dealership.	VARCHAR	255	False	False	False	False
		ID	The ID of manufacturer.	INT		False	True	False	True

Table D) Discount

Entity Name	Entity Description	Column Name	Column Description	Data Type	Length	Primary Key	Foreign Key	Nullable	Unique
Discount	Discount is the deduction from the full amount.	SNo	Symbol number for specific rates.	INT		True	False	False	True
		Discount	Percentage of discount given.	VARCHAR	255	False	False	False	False
		Validity	Valid time of the offer.	DATE		False	False	False	False
		ID	ID from Manufacturer.	INT		False	True	False	True

Table E) Register

Entity Name	Entity Description	Column Name	Column Description	Data Type	Length	Primary Key	Foreign Key	Nullable	Unique
Register	The record of the customers and sales.	SNo	Symbol number for the specific customers and their purchases.	INT		True	False	False	True
		Customer	Name of the customer	VARCHAR	255	False	False	False	False
		Purchase	The model name purchased by the customer.	VARCHAR	255	False	False	False	False
		ID	ID from manufacturer.	INT		False	True	False	True

6. Queries

1) Show the manufacturers which belong to Japan.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Manufacturer WHERE Country= ' Japan ';
+----+--------------+---------+
| ID | Manufacturer | Country |
+----+--------------+---------+
|  1 |  Yamaha      |  Japan  |
|  2 |  Honda       |  Japan  |
+----+--------------+---------+
```

2) Show the two-wheelers costlier than 5 Lakhs.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Model WHERE Price >500000;
+-----+-------------+--------+------+------+
| SNo | Model       | Price  | Year | ID   |
+-----+-------------+--------+------+------+
|   2 |  CRF 250 L  | 950000 | 2017 |    2 |
|   4 |  Duke 250   | 560000 | 2017 |    4 |
+-----+-------------+--------+------+------+
```

3) Show the two-wheelers cheaper than 4 Lakhs.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Model WHERE Price<400000;
+-----+----------+--------+------+------+
| SNo | Model    | Price  | Year | ID   |
+-----+----------+--------+------+------+
|   1 |  FZ25    | 350000 | 2017 |    1 |
|   3 |  NS 200  | 296000 | 2017 |    3 |
+-----+----------+--------+------+------+
```

4) Show the manufacturers for whom the dealership is Hansraj Hulaschand.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Dealership WHERE Dealership=' Hansraj Hulaschand ';
+-----+---------------------+----------+------+
| SNo | Dealership          | Location | ID   |
+-----+---------------------+----------+------+
|   3 |  Hansraj Hulaschand |  Teku    |    3 |
|   4 |  Hansraj Hulaschand |  Naxal   |    4 |
+-----+---------------------+----------+------+
```

5) Show the dealership locations in Teku.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Dealership WHERE Location=' Teku ';
+-----+----------------------+----------+------+
| SNo | Dealership           | Location | ID   |
+-----+----------------------+----------+------+
|   1 |  MAW Enterprises     |  Teku    |    1 |
|   2 |  Jyoti Group         |  Teku    |    2 |
|   3 |  Hansraj Hulaschand  |  Teku    |    3 |
+-----+----------------------+----------+------+
```

6) Show the names of the customers and their purchases in alphabetical order.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Register ORDER BY Customer;
+-----+--------------------+--------------+------+
| SNo | Customer           | Purchase     | ID   |
+-----+--------------------+--------------+------+
|   1 |  Chris Brown       |  FZ25        |    1 |
|   2 |  Kurt Cobain       |  CRF 250 L   |    2 |
|   4 |  Ninjas Hyper      |  Duke 250    |    4 |
|   3 |  Samragyee RL Shah |  NS 200      |    3 |
|   5 |  The Myth          |  Bullet 350  |    5 |
+-----+--------------------+--------------+------+
```

7) Show only the names of the manufacturers.

```
MariaDB [MotorcycleCompany]> SELECT DISTINCT( manufacturer ) FROM Manufacturer;
+-----------------+
| manufacturer    |
+-----------------+
|  Yamaha         |
|  Honda          |
|  Bajaj          |
|  KTM            |
|  Royal Enfield  |
+-----------------+
```

8) Show the two-wheelers whose price is in between 300000 to 600000.

```
MariaDB [MotorcycleCompany]> SELECT *FROM Model WHERE Price BETWEEN 300000 AND 600000;
+-----+-------------+--------+------+------+
| SNo | Model       | Price  | Year | ID   |
+-----+-------------+--------+------+------+
|   1 |  FZ25       | 350000 | 2017 |    1 |
|   4 |  Duke 250   | 560000 | 2017 |    4 |
|   5 | Bullet 350  | 440000 | 2016 |    5 |
+-----+-------------+--------+------+------+
```

9) Show the total price of goods in the table.

```
MariaDB [MotorcycleCompany]> SELECT SUM(Price) FROM Model;
+------------+
| SUM(Price) |
+------------+
|    2596000 |
+------------+
```

10) Show the most expensive two-wheeler.

```
MariaDB [MotorcycleCompany]> SELECT MAX(Price) FROM Model;
+------------+
| MAX(Price) |
+------------+
|     950000 |
+------------+
```

7. Research

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8. Conclusion

The coursework given to us by Islington College was one of the most interesting assignments ever. Due to this coursework, I got to learn more, apart from theoretical studies, because of the research work and practical work I had to do. I hope the upcoming course works are as exciting as this, so that we as students can learn more.

I faced a lot of problems during the completion of this coursework. I took lots of help of my module heads and teachers, who provided me with different ideas and solutions to my problems. I also want to thank my fellow classmates for helping me clear out my confusions during the classes we attended together.

While doing this course work, I ran into many errors and had to work very hard in order to debug them. But having to do so, I obtained a better knowledge and understanding about MySQL and DBMS. I also obtained transparent idea about the use of primary and foreign keys to create relation between to tables. But still, I am not totally satisfied by my understanding of this module, as I run into errors more times than not. So, I would like to further broaden my understanding of MySQL, DBMS and RDBMS.

Lastly, I would like to take the opportunity to thank Islington College and London Metropolitan University for providing us with such a wonderful platform to build a better background for our future.