Abstract

Database is a collection of data and the way to handle access and use the data. The system which manages all the activities related to database is known as database management system

Few years ago, when the database system was not come to picture, all the data in the various systems (like bank, railway station, hospital, etc.) were kept in files.It was very Confucius and lengthy process to access or change data in file system. The same problem was occurring to the hotel management.

Conceptual Model

A type of diagram which shows of a set ofrelationships between factors that are believe d toimpact or lead to a target condition; a diagram that defines theoretical entities, objects, or conditions of a system and the relationships between them.

Ex: This conceptual model has been divided into a set of process flow models, data flows, a logical data model and a data dictionary.

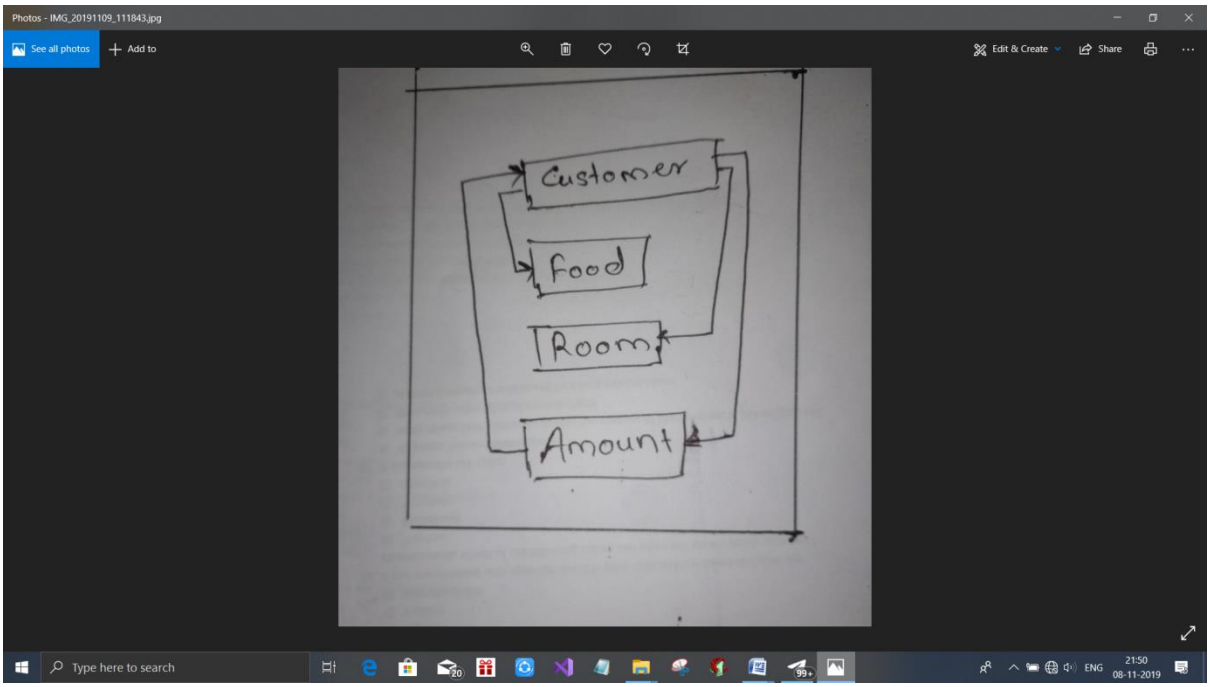


Fig 1 : Conceptual Model For Hotel Management System

E-R Model

The **entity-relationship model** (or ER model) is a way of graphically representing the logical relationships of entities (or objects) in order to create a database.In ER modeling, the structure for a database is portrayed as a diagram, called an entity-relationship diagram (or ER diagram), that resembles the graphical breakdown of a sentence into its grammatical parts. Entities are rendered as points, polygons, circles, or ovals. Relationships are portrayed as lines connecting the points, polygons, circles, or ovals. Any ER diagram has an equivalent relational table, and any relational table has an equivalent ER diagram. ER diagramming is an invaluable aid to engineers in the design, optimization, and debugging of database programs.

Below diagram shows ER diagram For a hotel management system -

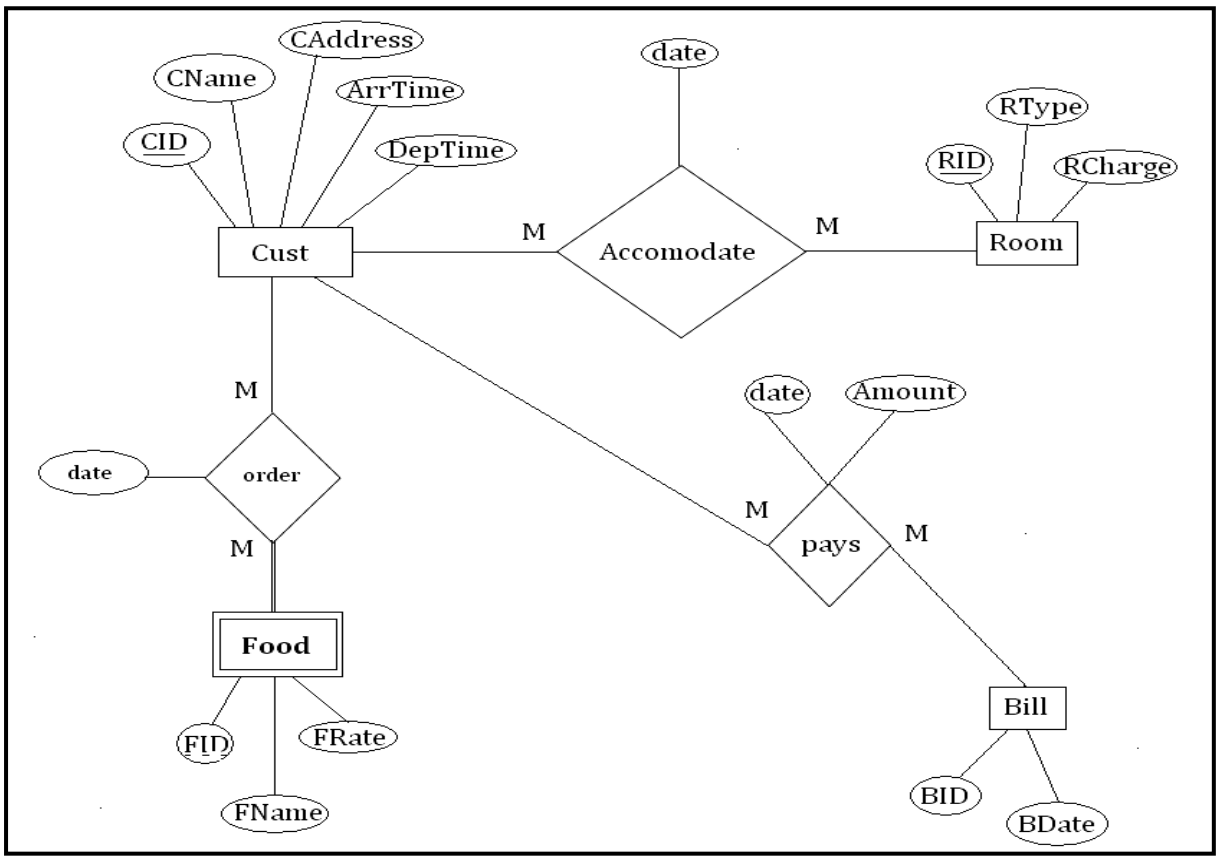


Fig 2 : E-R model for Hotel Management

333Relational Model

The **relational model** for database management is a database model based on first-order predicate logic, first formulated and proposed in 1969 by Edgar F. Codd. In the relational model of a database, all data is represented in terms of tuples, grouped intorelations. A database organized in terms of the relational model is a relational database.The purpose of the relational model is to provide a declarative method for specifying data and queries: users directly state what information the database contains and what information they want from it, and let the database management system software take care of describing data structures for storing the data and retrieval procedures for answering queries.

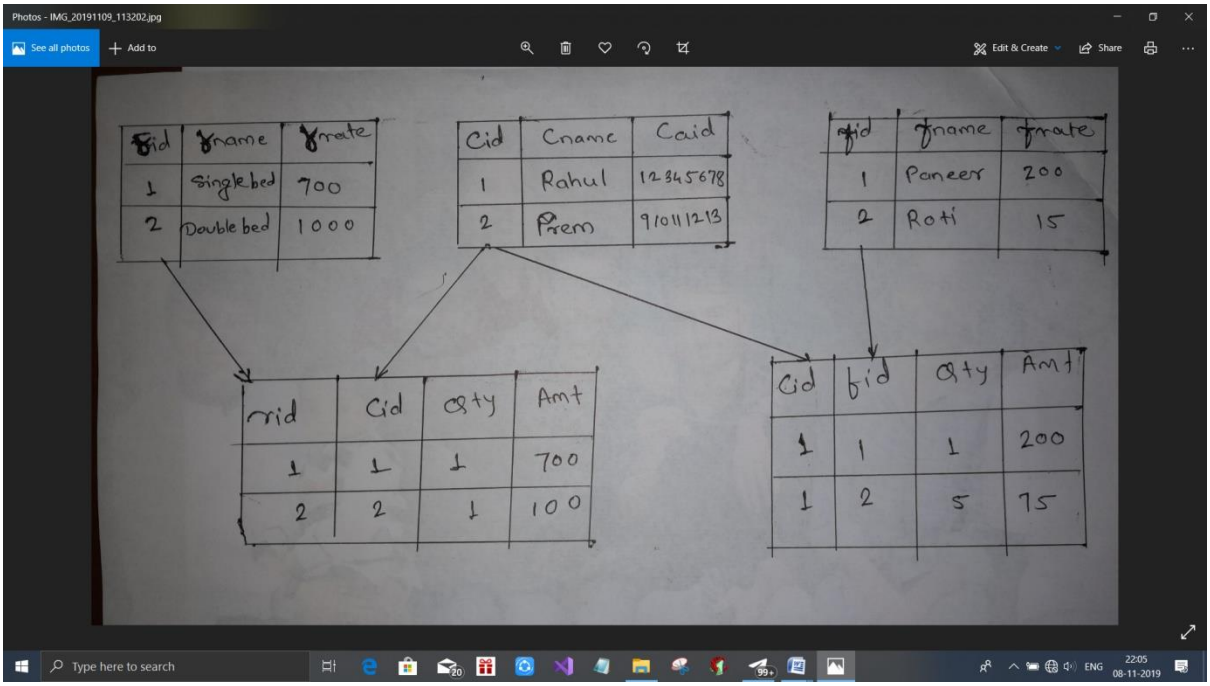


Fig 3 : Relational Model for Railway Reservation System

Mapping of conceptual model to relational model:

Customer—M—Accommodate—M—Room

Customer(cid,cname,caid)

Room(rid,rtype,rrate)

Accommodate(cid,rid,date)

Customer—M—Order—M—Food

Customer(cid,cname,caid)

Food(fid,fname,frate)

Order(cid,fid,date)

Normalization

Normalization is a systematic approach of decomposing tables to eliminate data redundancy and undesirable characteristics like Insertion, Update and Deletion Anamolies. It is a two step process that puts data into tabular form by removing duplicated data from the relation tables.

Problem Without Normalization:

Without Normalization, it becomes difficult to handle and update the database, without facing data loss. Insert, Update and Delete Anamolies are very frequent if Database is not Normalized.

Insert Anamolies:

When we want to enter a value into a data cell but the attempt is prevented, as another value is not known.

Update Anamolies:

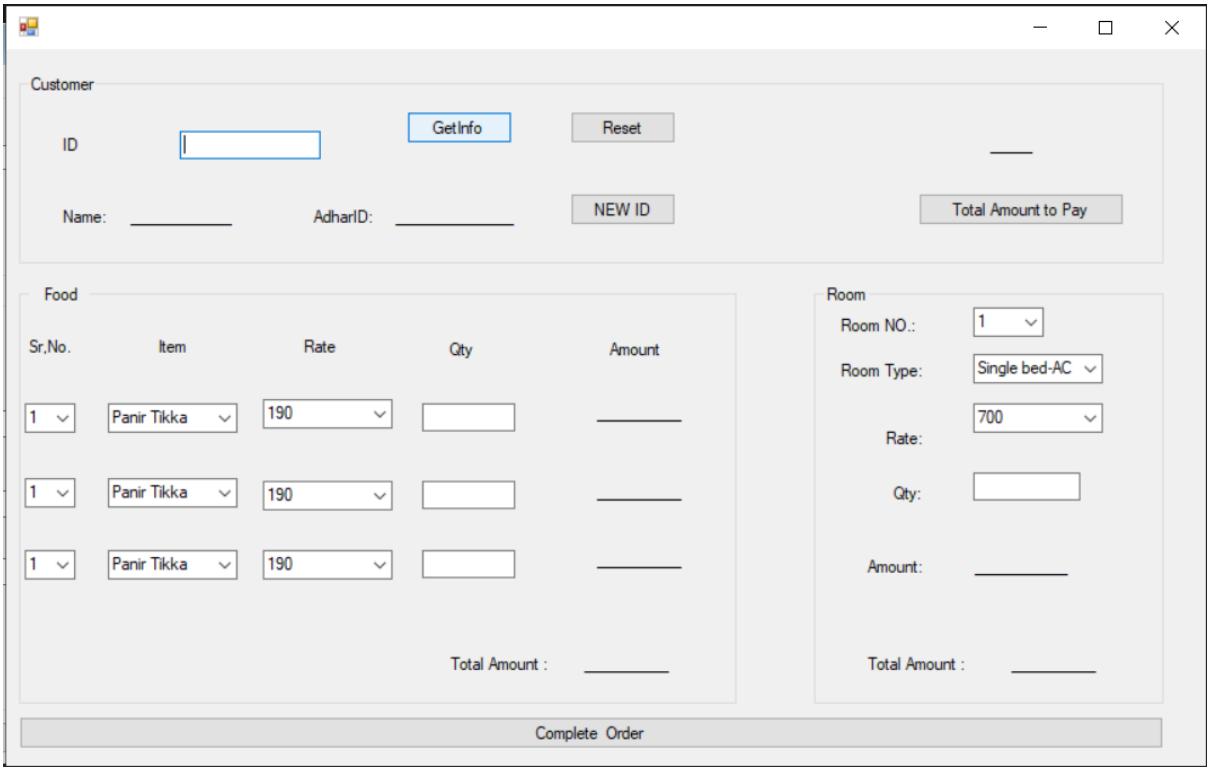
When we want to change a single data item value, but must update multiple entries.

Delete Anamolies:

When a value we want to delete also means we will delete values we wish to keep.

Un-Normalized form (UNF):

A table that contains one or more attribute or group of attributes within a table that occurs with multiple values for a single occurrence of the nominated key attributes of that table.



R(cid,cname,caid(fid,fname,frate)(rid,rname,rrate))

First normal form (1NF): A relation in which the intersection of each row and column contains one and only one value.

Ex :

R_1(cid,cname,caid)

R_2(fid,fname,frate,qty,amt)

R_3 (rid,rname,rrate,qty,amt)

Second normal form (2NF): A relation that is in 1NF and every non-primary key attribute is fully functionally dependent on the primary key.

Ex :

R_1(cid,cname,caid)

R_2(fid,fname,frate)

R_{21}(cid,fid,qty,amt)

R_3 (rid,rname,rate)

R_{31}(cid,rid,qty,amt)

Third normal form (3NF): A relation that is in 1NF and 2NF, and in which no non-primary key attribute is transitively dependent on the primary key.

Ex :

R_1(cid,cname,caid)

R_2(fid,fname,frate)

R_{21}(cid,rid,qty,amt)

R_3 (rid,rname,rrate)

R_{31}(cid,rid,qty,amt)

SQL 1 Snapshots

First of all we will create a new database **hotelm**as follows-

```
mysql> create database hotelm;
Query OK, 1 row affected (0.01 sec)

mysql> use hotelm;
Database changed
mysql>
```

In this database, we will add relations namely , customer , food , room , fbill , rbill .

```
mysql> create database hotelm;
Query OK, 1 row affected (0.01 sec)

mysql> use hotelm;
Database changed
mysql> create table customer(cid integer NOT NULL AUTO_INCREMENT, cname varchar(50), caid numeric(20), primary key(cid));
Query OK, 0 rows affected (0.07 sec)

mysql> create table FOOD(fid int(50) NOT NULL AUTO_INCREMENT, fname varchar(20), frate int(30), primary key(fid));
Query OK, 0 rows affected, 2 warnings (0.06 sec)

mysql> create table ROOM(rid int(50) NOT NULL AUTO_INCREMENT, rtype varchar(20), rrate int(50), primary key(rid));
Query OK, 0 rows affected, 2 warnings (0.06 sec)

mysql> create table fbill(cid numeric(5), fid numeric(10), primary key(cid , fid), Qty integer, Amt integer);
Query OK, 0 rows affected (0.06 sec)

mysql> create table Rbill(cid numeric(5), rid numeric(5), primary key(cid , rid), Qty integer, Amt integer);
Query OK, 0 rows affected (0.05 sec)

mysql>
```

Customer tables stores customer details like customer id , customer name , customer adhar id . Foods table stores details about food ID ,food name and food rate . room table stores details about rooms in hotel. While fbill and rbill stores billing of food and room .

```
mysql> desc customer;
+-------+--------------+------+-----+---------+----------------+
| Field | Type         | Null | Key | Default | Extra          |
+-------+--------------+------+-----+---------+----------------+
| cid   | int(11)      | NO   | PRI | NULL    | auto_increment |
| cname | varchar(50)  | YES  |     | NULL    |                |
| caid  | decimal(20,0)| YES  |     | NULL    |                |
+-------+--------------+------+-----+---------+----------------+
3 rows in set (0.02 sec)

mysql> desc food;
+-------+-------------+------+-----+---------+----------------+
| Field | Type        | Null | Key | Default | Extra          |
+-------+-------------+------+-----+---------+----------------+
| fid   | int(50)     | NO   | PRI | NULL    | auto_increment |
| fname | varchar(20) | YES  |     | NULL    |                |
| frate | int(30)     | YES  |     | NULL    |                |
+-------+-------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)

mysql> desc room;
+-------+-------------+------+-----+---------+----------------+
| Field | Type        | Null | Key | Default | Extra          |
+-------+-------------+------+-----+---------+----------------+
| rid   | int(50)     | NO   | PRI | NULL    | auto_increment |
| rtype | varchar(20) | YES  |     | NULL    |                |
| rrate | int(50)     | YES  |     | NULL    |                |
+-------+-------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)

mysql> desc fbill;
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| cid   | decimal(5,0) | NO   | PRI | NULL    |       |
| fid   | decimal(10,0)| NO   | PRI | NULL    |       |
| Qty   | int(11)      | YES  |     | NULL    |       |
| Amt   | int(11)      | YES  |     | NULL    |       |
+-------+--------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Here we are inserting values in Food table.

```
mysql> insert into FOOD value(1,'Panir Tikka',190);insert into FOOD value(2,'Malai Kofta',150);insert into FOOD value(3,'Kaju Katli',1
25);insert into FOOD value(4,'Dam Aalu',110);insert into FOOD value(5,'Veg Kolhapuri',100);insert into FOOD value(6,'Methi Masala',90)
;insert into FOOD value(7,'Bengan Masala',80);insert into FOOD value(8,'Palak Paneer',150);insert into FOOD value(9,'Bhendi Fry',90);i
nsert into FOOD value(10,'Tanduri Roti',15);insert into FOOD value(11,'Bhakri',15);insert into FOOD value(12,'Mater Paneer',175);inser
t into FOOD value(13,'Veg Manchurian',80);insert into FOOD value(14,'Masala Papad',10);insert into FOOD value(15,'Plain Rice',80);inse
rt into FOOD value(16,'Pulav',100);insert into FOOD value(17,'Ice-Cream',50);
Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

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Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)
```
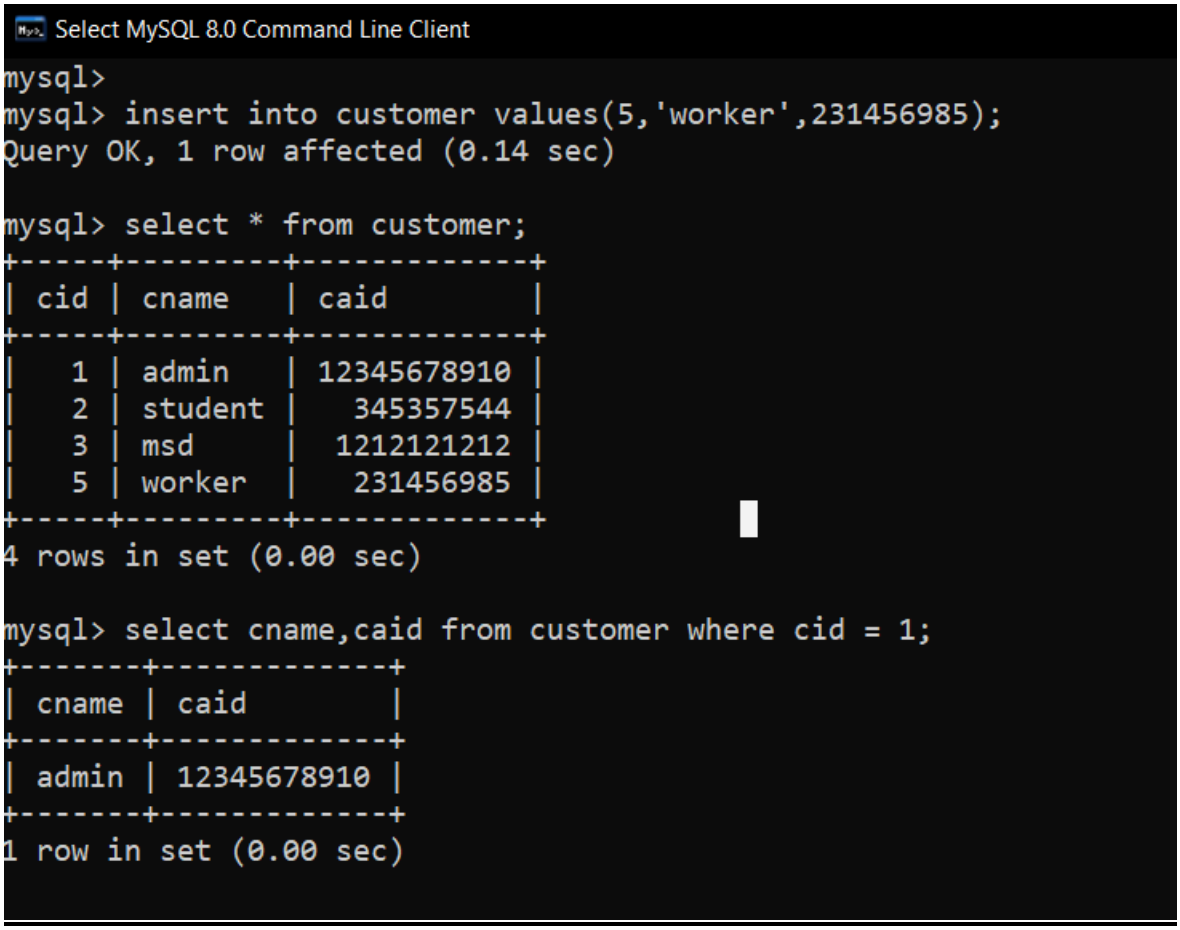
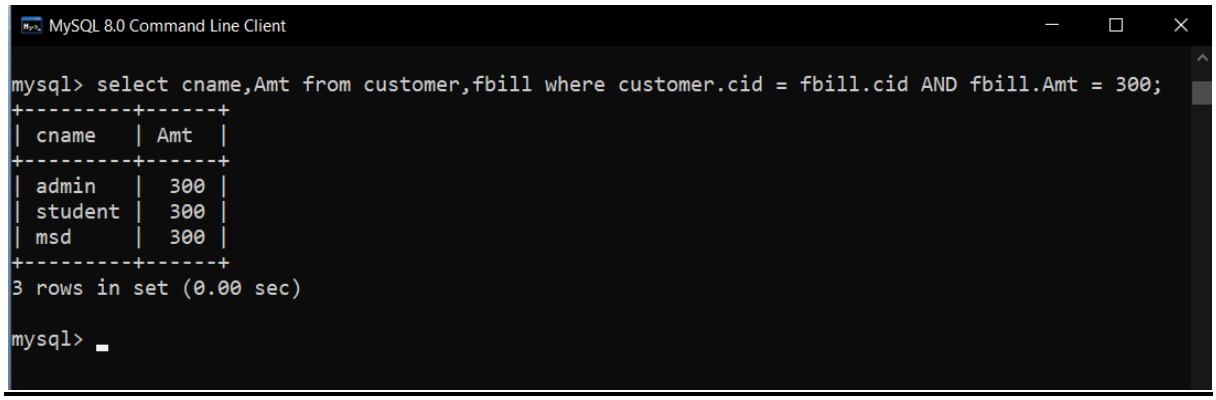
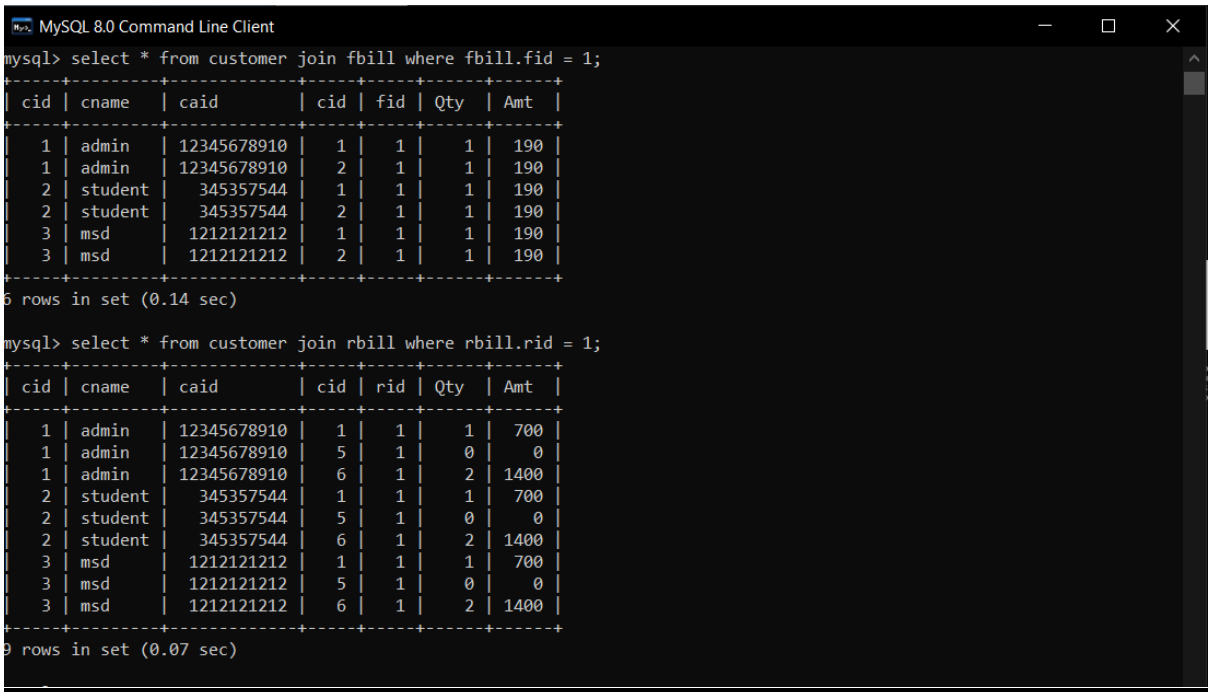

Here we are inserting values in Room table.

```
mysql> insert into ROOM value(1,'Single bed-AC',700);insert into ROOM value(2,'Single bed-AC',700);insert into ROOM value(3,'Single be
d-AC',700);insert into ROOM value(4,'Single bed-AC',700);insert into ROOM value(5,'Double bed-AC',1000);insert into ROOM value(6,'Doub
le bed-AC',1000);insert into ROOM value(7,'Double bed-AC',1000);insert into ROOM value(8,'Double bed-AC',1000);insert into ROOM value(
9,'Double bed-NON_AC',800);insert into ROOM value(10,'Double bed-NON_AC',800);insert into ROOM value(11,'Double bed-NON_AC',800);inser
t into ROOM value(12,'Single bed-NON_AC',500);insert into ROOM value(13,'Single bed-NON_AC',500);insert into ROOM value(14,'Single bed
-NON_AC',500);insert into ROOM value(15,'Single bed-NON_AC',500);
Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)
```

SQL 2 Snapshots

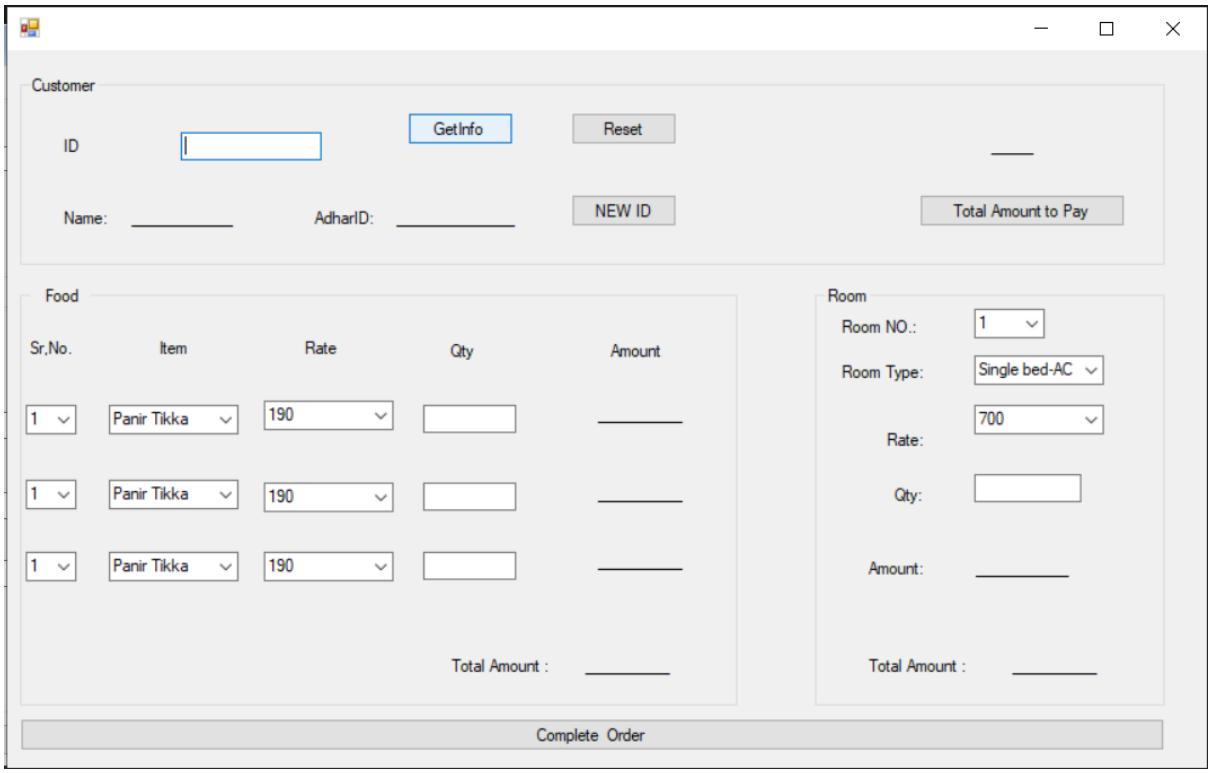




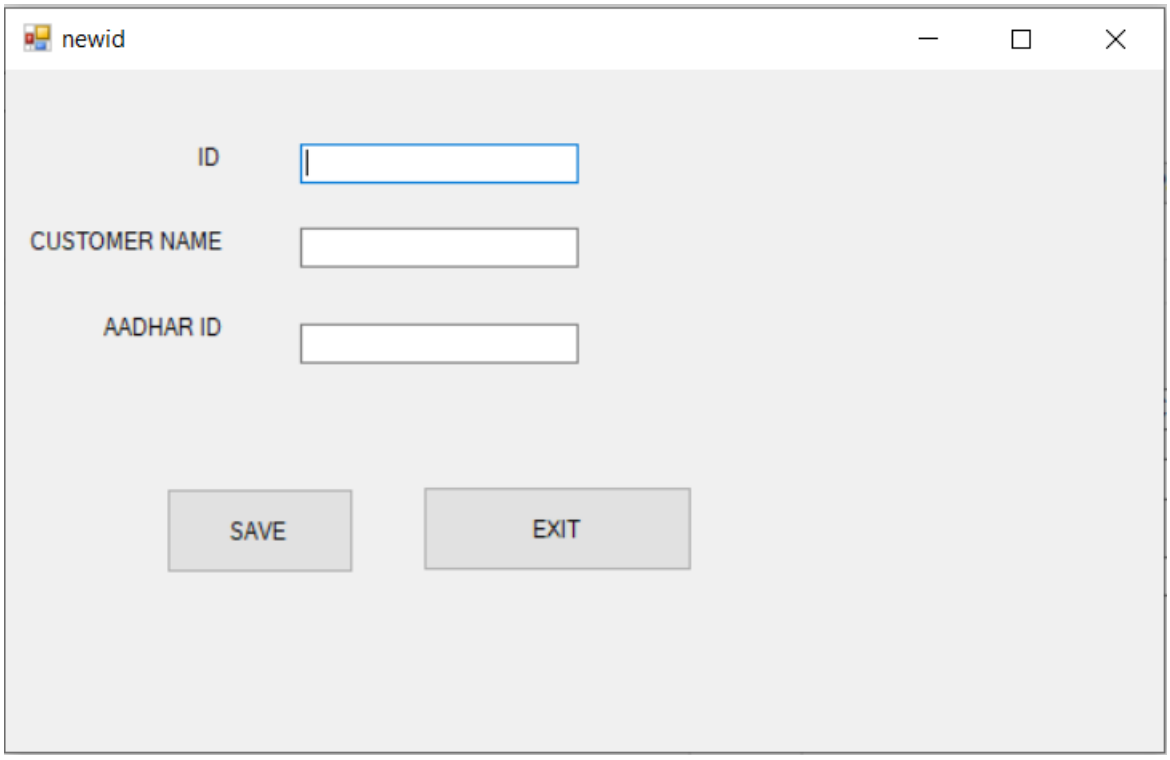

MySQL 8.0 Command Line Client
mysql> select * from customer join fbill where fbill.fid = 1;
cid	cname	caid	cid	fid	Qty	Amt
1	admin	12345678910	1	1	1	190
1	admin	12345678910	2	1	1	190
2	student	345357544	1	1	1	190
2	student	345357544	2	1	1	190
3	msd	1212121212	1	1	1	190
3	msd	1212121212	2	1	1	190
6 rows in set (0.14 sec)
mysql> select * from customer join rbill where rbill.rid = 1;
cid	cname	caid	cid	rid	Qty	Amt
1	admin	12345678910	1	1	1	700
1	admin	12345678910	5	1	0	0
1	admin	12345678910	6	1	2	1400
2	student	345357544	1	1	1	700
2	student	345357544	5	1	0	0
2	student	345357544	6	1	2	1400
3	msd	1212121212	1	1	1	700
3	msd	1212121212	5	1	0	0
3	msd	1212121212	6	1	2	1400
9 rows in set (0.07 sec)

Application Snapshot

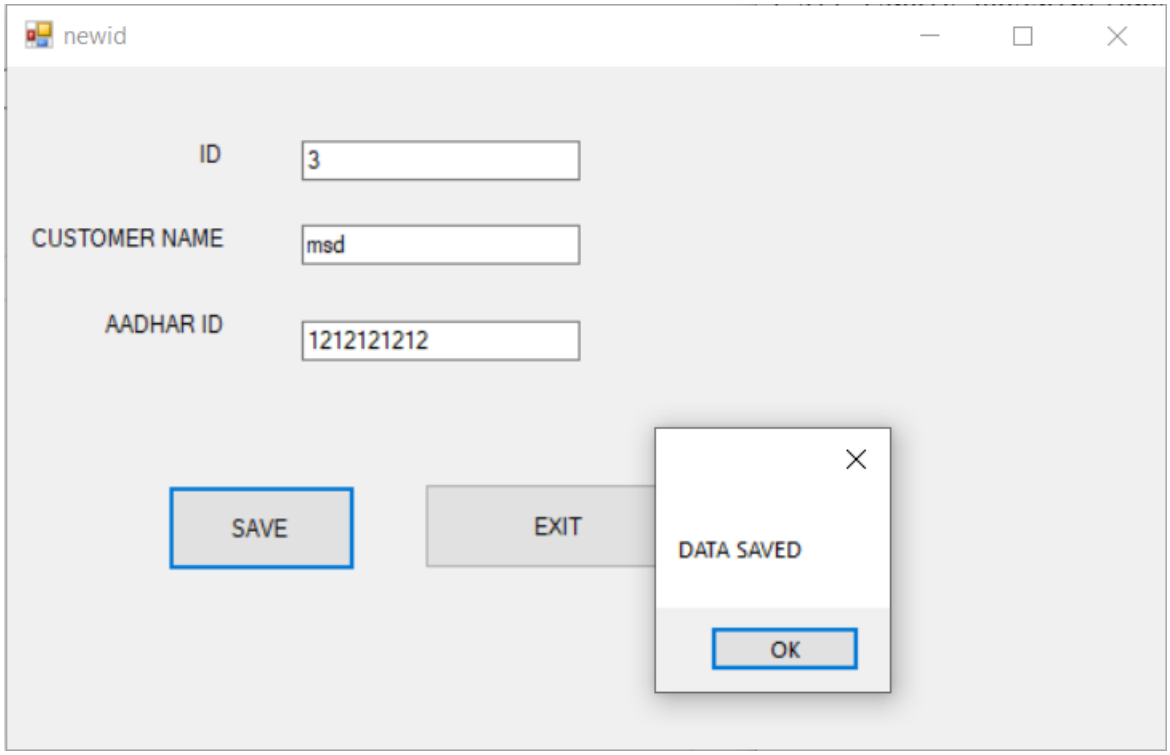
Following application window shows main interface of hotel management application-



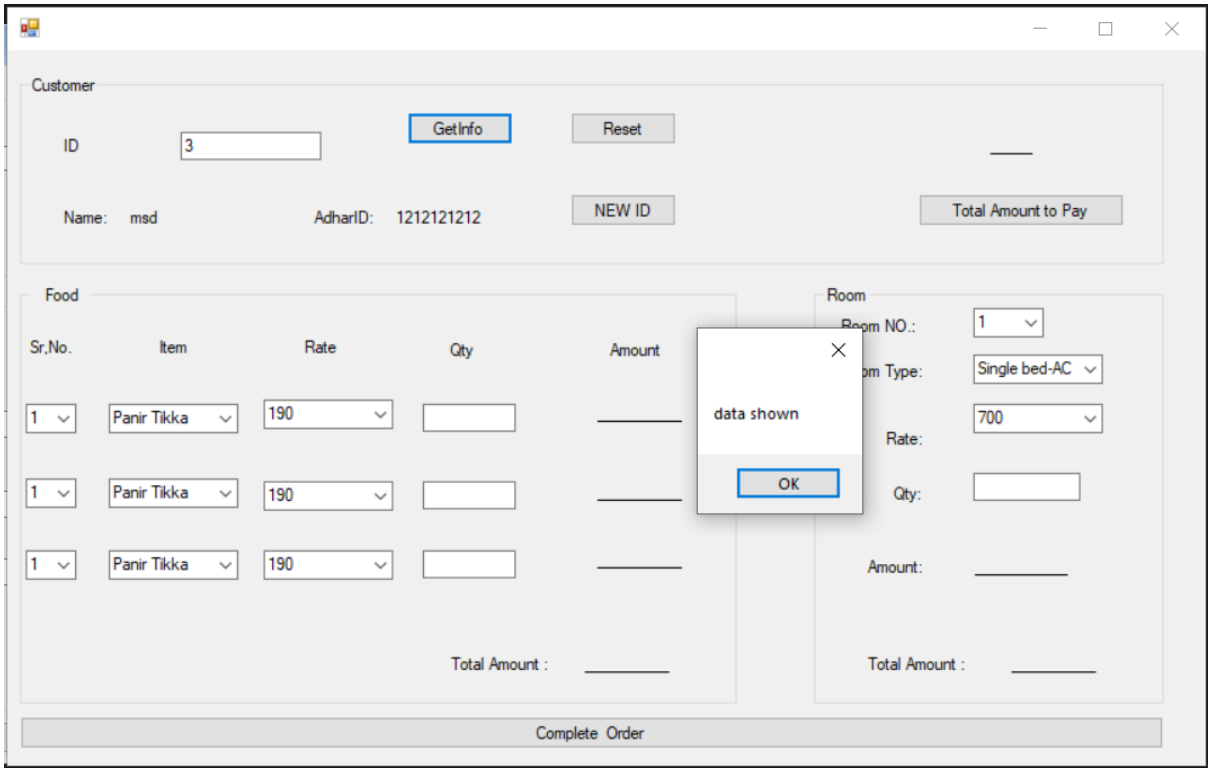
Here we can use previous customer ID or create new one , to create new ID , just click on NEW ID button on main screen. Following window shows interface to create new ID.



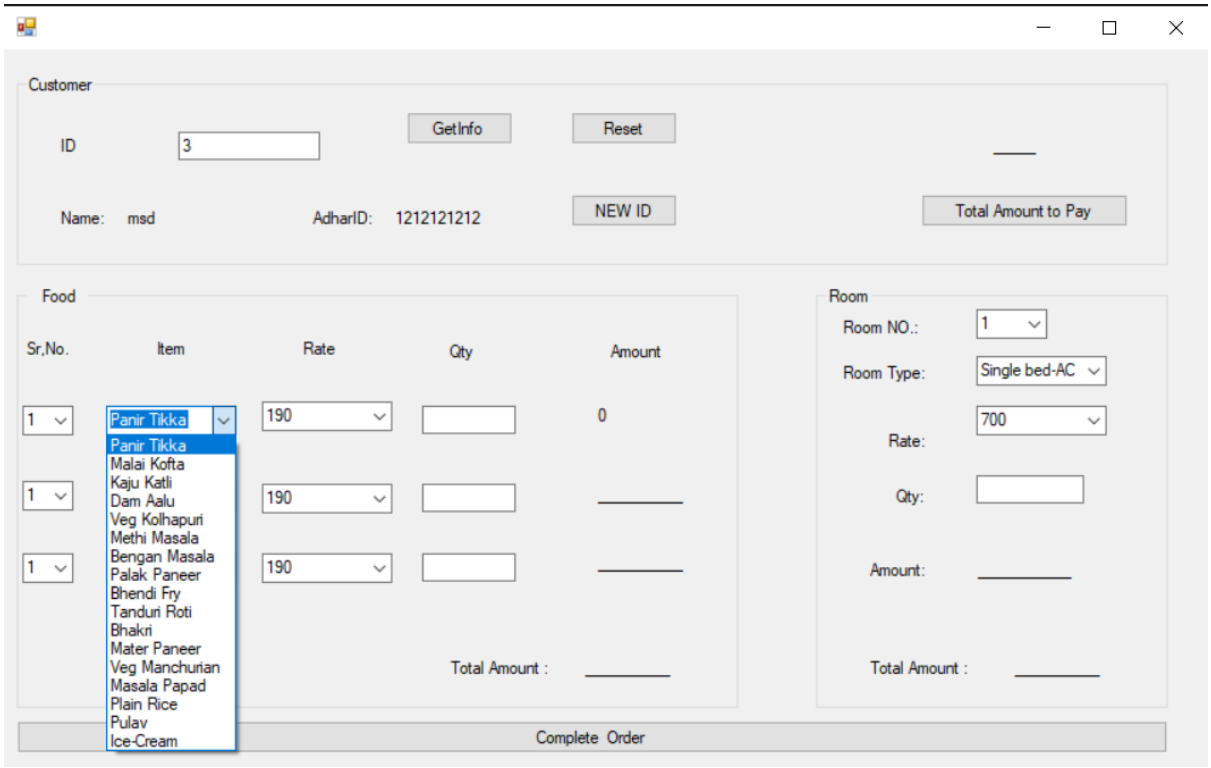
On entering valid details and pressing SAVE button a pop up appears as follows:



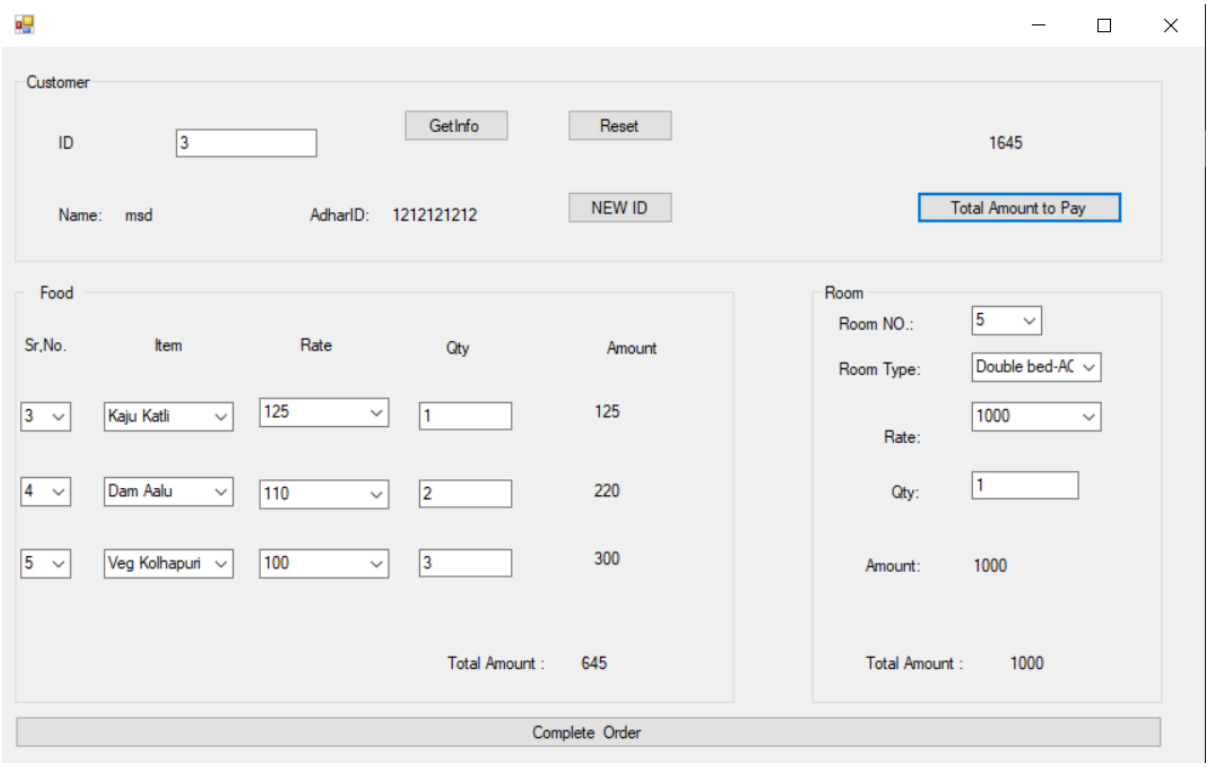
Now in main window , when we enter customer ID , customer name and adhar ID appers . Following window –



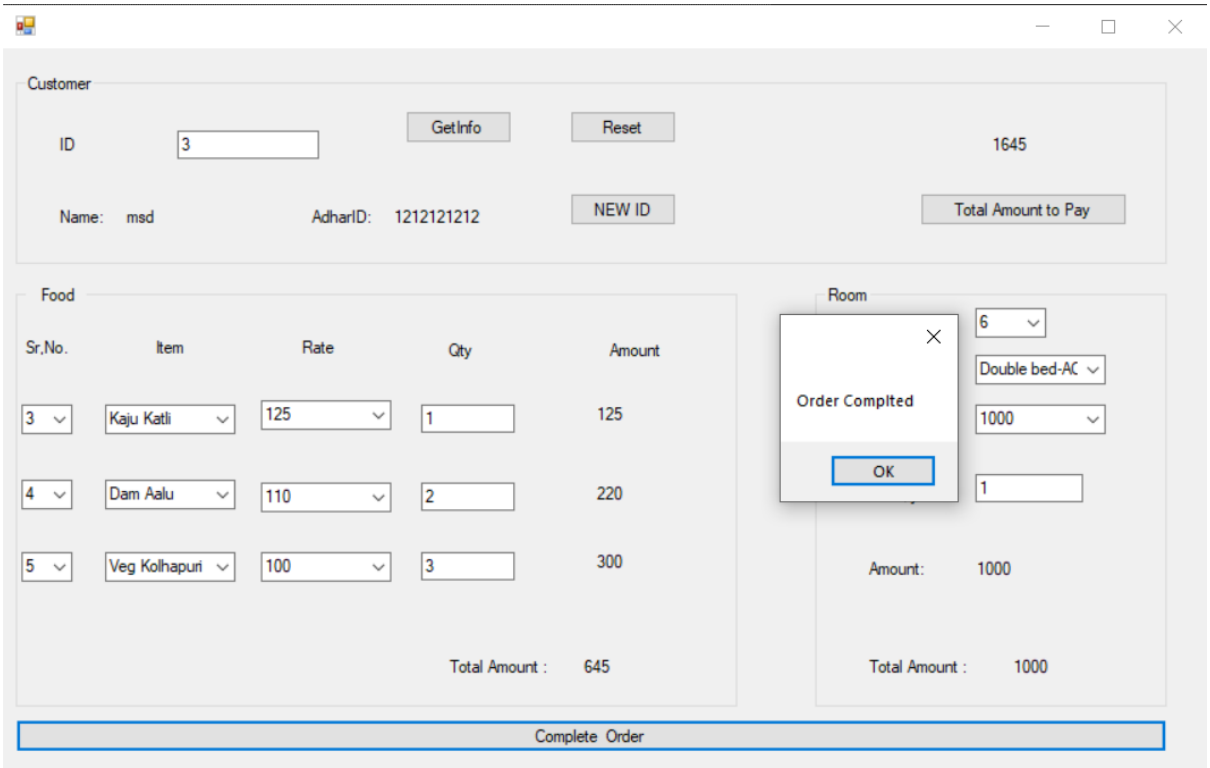
After entering ID and we can choose food and room details-



After entering all details , total amount to pay is calculated-



To complete order , we have to click on Complete Order button and a pop up appears-



Source Code

```
Form 1
ImportsMySql.Data.MySqlClient
PublicClassreciption
Dim conn
AsNewMySqlConnection("server=localhost;userid=root;password=future;persistsecurityinfo
=True;database=hotelm")
Dim cmd1 AsMySqlCommand
DimrdrAsMySqlDataReader
DimrdAsNewDataTable
DimcmdAsMySqlCommand
DimadrAsMySqlDataAdapter
PrivateSubreciption_Load(sender AsObject, e AsEventArgs) HandlesMyBase.Load
'TODO: This line of code loads data into the 'HotelmDataSet.room' table. You can move,
or remove it, as needed.
Me.RoomTableAdapter.Fill(Me.HotelmDataSet.room)
'TODO: This line of code loads data into the 'HotelmDataSet.food' table. You can move,
or remove it, as needed.
Me.FoodTableAdapter.Fill(Me.HotelmDataSet.food)

EndSub
Dim a AsInteger
Dim b AsInteger
DimmulAsInteger
PrivateSubGetInfo_Click(sender AsObject, e AsEventArgs) HandlesGetInfo.Click
Try
conn.Open()
cmd = NewMySqlCommand("use hotelm", conn)
cmd.ExecuteNonQuery()
            cmd1 = NewMySqlCommand("select * from customer where cid=@id", conn)
cmd1.Parameters.AddWithValue("@id", Val(TB1.Text))
adr = NewMySqlDataAdapter(cmd1)
Try
adr.Fill(rd)
                Label2.Text = rd(0)(1)
                Label3.Text = rd(0)(2)
MessageBox.Show("data shown")
Catch ex As Exception
MessageBox.Show("Invalid id")
EndTry
Catch ex AsMySqlException
MessageBox.Show(ex.ToString)
EndTry
EndSub
PrivateSub Button2_Click(sender AsObject, e AsEventArgs) Handles Button2.Click
newid.Show()
EndSub
PrivateSub M1_Click(sender AsObject, e AsEventArgs) Handles M1.Click
        a = Val(R1.Text)
        b = Val(Q1.Text)
mul = (a * b)
        M1.Text = mul
EndSub
PrivateSub M2_Click(sender AsObject, e AsEventArgs) Handles M2.Click
        a = Val(R2.Text)
        b = Val(Q2.Text)
mul = (a * b)
        M2.Text = mul
EndSub
PrivateSub M3_Click(sender AsObject, e AsEventArgs) Handles M3.Click
```

```
        a = Val(R3.Text)
        b = Val(Q3.Text)
mul = (a * b)
        M3.Text = mul
EndSub
Dim sum AsInteger
Dim c AsInteger
PrivateSubTotal_Click(sender AsObject, e AsEventArgs) HandlesTotal.Click
        a = Val(M1.Text)
        b = Val(M2.Text)
        c = Val(M3.Text)
sum = (a + b + c)
Total.Text = sum
EndSub
PrivateSubAmt_Click(sender AsObject, e AsEventArgs) HandlesAmt.Click
        a = Val(RR.Text)
        b = Val(RQ.Text)
mul = (a * b)
Amt.Text = mul
EndSub
PrivateSubRTotal_Click(sender AsObject, e AsEventArgs) HandlesRTotal.Click
RTotal.Text = Amt.Text
EndSub
PrivateSub Button3_Click(sender AsObject, e AsEventArgs) Handles Button3.Click
        a = Val(Total.Text)
        b = Val(RTotal.Text)
sum = (a + b)
TA.Text = sum
EndSub
PrivateSub Button1_Click(sender AsObject, e AsEventArgs) Handles Button1.Click
        Q1.Text = ""
        Q2.Text = ""
        Q3.Text = ""

        M1.Text = "__________"
        M2.Text = "__________"
        M3.Text = "__________"

Total.Text = "__________"

RQ.Text = ""
Amt.Text = "__________"
RTotal.Text = "__________"

TA.Text = "_____"
EndSub
Dim cmd2 AsMySqlCommand
Dim cmd3 AsMySqlCommand
Dim cmd4 AsMySqlCommand
Dim cmd5 AsMySqlCommand
PrivateSub Button4_Click(sender AsObject, e AsEventArgs) Handles Button4.Click
Try
cmd = NewMySqlCommand("use hotelm", conn)
cmd.ExecuteNonQuery()
            cmd2 = NewMySqlCommand("insert into fbill values(@cid, @fid, @Qty, @Amt)",
conn)
cmd2.Parameters.AddWithValue("@cid", Val(TB1.Text))
cmd2.Parameters.AddWithValue("@fid", Val(F1.Text))
cmd2.Parameters.AddWithValue("@Qty", Val(Q1.Text))
cmd2.Parameters.AddWithValue("@Amt", Val(M1.Text))
cmd2.ExecuteNonQuery()
```

```
            cmd3 = NewMySqlCommand("insert into fbill values(@cid, @fid, @Qty, @Amt)",
conn)
cmd3.Parameters.AddWithValue("@cid", Val(TB1.Text))
cmd3.Parameters.AddWithValue("@fid", Val(F2.Text))
cmd3.Parameters.AddWithValue("@Qty", Val(Q2.Text))
cmd3.Parameters.AddWithValue("@Amt", Val(M2.Text))
cmd3.ExecuteNonQuery()
            cmd4 = NewMySqlCommand("insert into fbill values(@cid, @fid, @Qty, @Amt)",
conn)
cmd4.Parameters.AddWithValue("@cid", Val(TB1.Text))
cmd4.Parameters.AddWithValue("@fid", Val(F3.Text))
cmd4.Parameters.AddWithValue("@Qty", Val(Q3.Text))
cmd4.Parameters.AddWithValue("@Amt", Val(M3.Text))
cmd4.ExecuteNonQuery()
            cmd5 = NewMySqlCommand("insert into rbill values(@cid, @fid, @Qty, @Amt)",
conn)
cmd5.Parameters.AddWithValue("@cid", Val(TB1.Text))
cmd5.Parameters.AddWithValue("@fid", Val(RN.Text))
cmd5.Parameters.AddWithValue("@Qty", Val(RQ.Text))
cmd5.Parameters.AddWithValue("@Amt", Val(Amt.Text))
cmd5.ExecuteNonQuery()
MessageBox.Show("Order Complted")
Catch ex AsMySqlException
MessageBox.Show("Some Food or Room is Already Ordered")
EndTry
EndSub
EndClass
```

Form 2

```
ImportsMySql.Data.MySqlClient
PublicClassnewid
Dim conn
AsNewMySqlConnection("server=localhost;userid=root;password=future;persistsecurityinfo
=True;database=hotelm")
Dim cmd1 AsMySqlCommand
DimrdrAsMySqlDataReader
DimrdAsNewDataTable
DimcmdAsMySqlCommand
PrivateSub Button1_Click(sender AsObject, e AsEventArgs) Handles Button1.Click
Try
conn.Open()
cmd = NewMySqlCommand("use hotelm", conn)
cmd.ExecuteNonQuery()
'cmd1 = New MySqlCommand("insert into marksheet1 values('name',62,11,'BC',20,20)",
conn)
            cmd1 = NewMySqlCommand("insert into customer values(@cid,@cname,@caid)",
conn)
cmd1.Parameters.AddWithValue("@cid", Val(TextBox1.Text))
cmd1.Parameters.AddWithValue("@cname", (TextBox2.Text))
cmd1.Parameters.AddWithValue("@caid", Val(TextBox3.Text))
cmd1.ExecuteNonQuery()
conn.Close()
MessageBox.Show("DATA SAVED")
Catch ex AsMySqlException
MessageBox.Show(ex.ToString)
EndTry
EndSub
PrivateSub Button2_Click(sender AsObject, e AsEventArgs) Handles Button2.Click
```

```
Me.Close()
EndSub
PrivateSub TextBox1_TextChanged(sender AsObject, e AsEventArgs) Handles
TextBox1.TextChanged

EndSub
EndClass
```