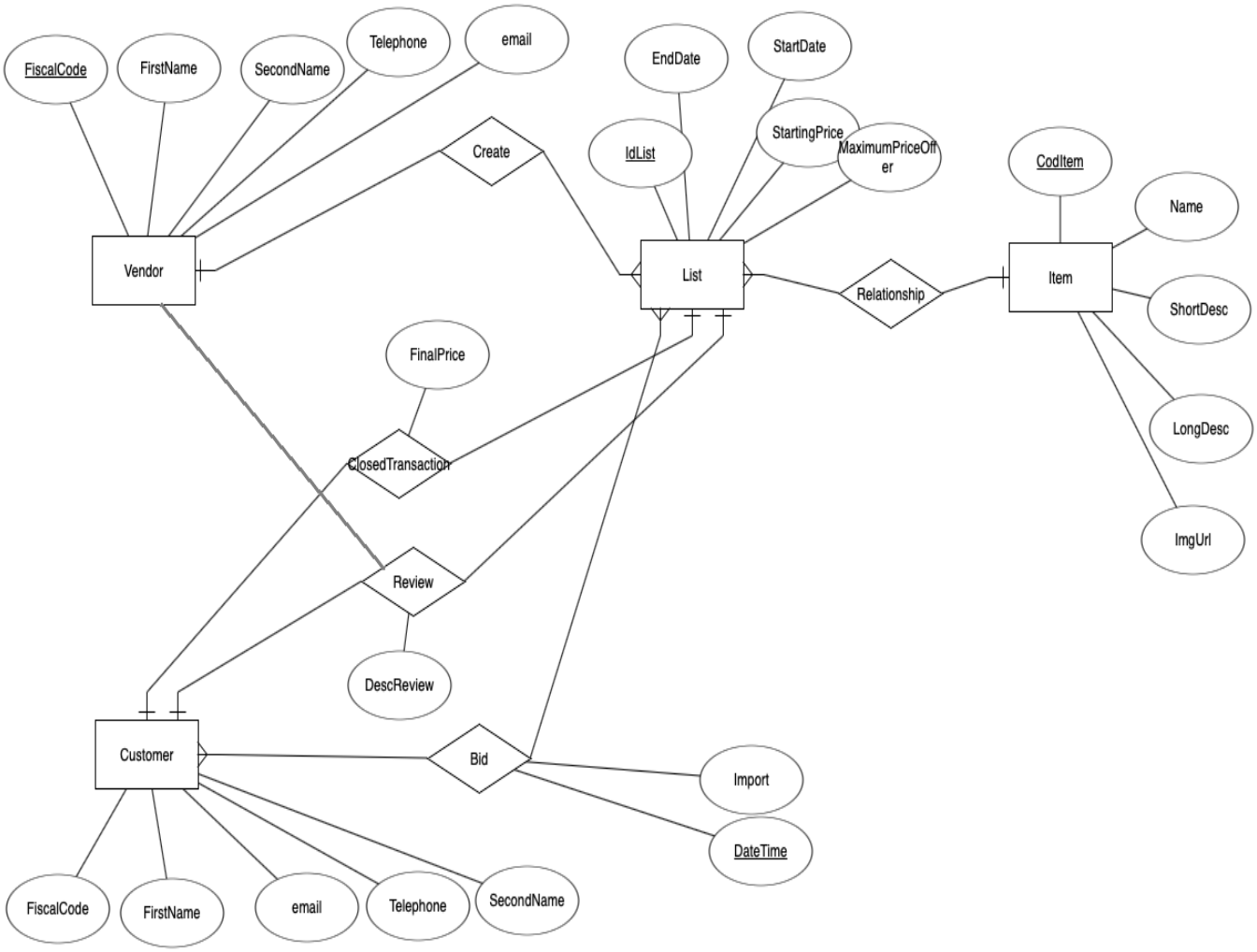
CMM524 ADVANCED DATA MANAGEMENT RESIT

ER Schema:



Assumptions:

1) An user could be in the database only once as vendor and once as customer.
   The primary key of this two table's is the fiscal code, so an user could be registered twice with the same fiscal code.
2) An user could list a new item writing the description of the item by itself(insert new item into the catalog) or it could list an item that is already in the catalog(Item Entity)
3) The List entity is unique and it is created by a vendor that want to sell an item. It has attribute like start date and end date, starting price and maximum_price_offer that are strictly related to the single list (primary key ListCode)
4) The same item like "Pasta divella" could be present twice in the db, but with a different description.

For the auction system they are completely different items,so the attributes in the item table are strictly related to the cod_item.

5) The N-M Bid relationship is created by adding datetime as primary key because an user could make more bid on the same item. The amount is strictly related to the primary key that is CustomerFiscalCode,datetime,Id_list
6) The status “pending” is assigned by the system when the sysdate is less than start_date of the list, the status on going when start_date is less than sysdate is less than end date, the status finished when the sysdate is greater than end_date.
7) If the list_status is on pending, the current bidding price is determined by selecting the amount in the row related to the list with the max datetime.
8) When the list is closed the final transaction will be stored in the closed transaction table with the final amount.
9) The integrity of the review table is checked at run time by the system. When a seller want to leave a review to the buyer, the system checks if the seller is the SELLER table and if the buyer on which it wants to leave a review is related to the item that he is going to review. If everything is ok, then the system put the SELLER_ID into the from column of the review field, the buyer id into the TO COLUMN of the review table and then store the message and the stars on the database. If something went wrong, it manages the exception. The system works in the same way if the review is written from the customer, it put the customer_id into the FROM field and into the TO field it puts the seller id, same logic for the message and the stars.

The next image show the list table before the normalization process.

COD_ITEM	ID_LIST	START_DATE	END_DATE	START_PRICE	MAXIMUM_BID_PRICE	FISCAL_CODE	NAME	SHORT_DESC	LONG_DESC	IMG_URL
1	1	2021-07-13 23:29:52	2021-07-13 23:29:53	5.00	10	CF34	PASTA DIVELLA	Best Pasta	Best Italian Pasta	http:hello

NORMALISATION:

The table is in 1st normal form because all attributes are atomic, but not all non-prime attributes are fully dependent on the primary key.

The primary key of the table is the ID_LIST and the dependencies are cod_item, fiscal_code, start_date ,end_date, start_price, maximum_bid_price are fully dependent on the primary key

but the attributes name,short_desc,long_desc,img_url are dependent on the cod_item field.

so the output of the normalization process is the following:

1) table list with cod_item,fiscal_code,start_date,end_date,start_price,maximum_bid_price → id_list primary key

ID_LIST	START_DATE	END_DATE	START_PRICE	MAXIMUM_BID_PRICE	COD_ITEM	FISCAL_CODE
1	2021-07-13 23:29:52	2021-07-13 23:29:53	5.00	10	1	CF34

2) table item name,short_desc,long_desc,img_url→ cod_item field

COD_ITEM	NAME	SHORT_DESC	LONG_DESC	IMG_URL
1	PASTA DIVELLA	Best Pasta	Best Italian Pasta	http:hello

3) vendor table with first_name,second_name,telephone,email→ fiscal_code

FISCAL_CODE	FIRST_NAME	SECOND_NAME	TELEPHONE	EMAIL
CF34	Jhon	Bush	4563212	bush@gmail.com

The next image will show the bid table before the normalization process.

1NF Output:

FISCAL_CODE	FIRST_NAME	SECOND_NAME	TELEPHONE	EMAIL	ID_LIST	DATETIME	BID
CF36	PETER	JOSH	45673	JOSH@gmail.com	1	2021-07-14	5.00

2NF and 3NF:

The primary key of the table is composed by (id_list,fiscal_code,date_time) because of the need to store multiple bid on the same item made by the same person.

But the above table is not in 2nd normal form, because the field first_name,second_name,telephone and email are dependent by fiscal_code that is a part of the three fields primary key of the table.

The table with this structure will be the cause of a lot of problems, like updating anomalies, and out of all the data of the fields first_name,second_name,telephone and email are redundant in this table.

So the output of the 3NF normalization process consist of two tables,one for the bid and one for the customers details.In the Bid tables there is a foreign key to the fiscal_code field of the customers table.

All the tables are

BID TABLE:

FISCAL_CODE_CUST	ID_LIST	DATETIME	BID
CF36	1	2021-07-14	5.00

CUSTOMER TABLE:

FISCAL_CODE	FIRST_NAME	SECOND_NAME	TELEPHONE	EMAIL
CF36	PETER	JOSH	45673	JOSH@gmail.com

The list table with the item description before 3rd normalization process:

the primary key is the id_list field

the field name,short_desc,long_desc,img_url depends on the cod_item which is not a primary key

COD_ITEM	NAME	SHORT_DESC	LONG_DESC	IMG_URL	ID_LIST	START_DATE	END_DATE	START_PRICE	MAXIMUM_BID_PRICE	FISCAL_CODE
1	PASTA DIVELLA	Best Pasta	Best Italian Pasta	http:hello	1	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	CF34

Output of the normalization process:

item table:

COD_ITEM	NAME	SHORT_DESC	LONG_DESC	IMG_URL
1	PASTA DIVELLA	Best Pasta	Best Italian Pasta	http:hello

list table:

ID_LIST	START_DATE	END_DATE	START_PRICE	MAXIMUM_BID_PRICE	COD_ITEM	FISCAL_CODE
1	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	1	CF34

CLOSED_TRANSACTION TABLES DENORMALIZED

final_price → (id_list,fiscal_code_cust,datetime primary keys)

fiscal_code_vendor ,start_date,end_date,start_price,maximum_price,cod_item → id_list

first_name,second_name,telephone,email→ fiscal_code_vendor →id_list

ID_LIST	FISCAL_CODE_CUST	FINAL_PRICE	DATETIME	START_DATE	END_DATE	START_PRICE	MAXIMUM	COD_ITEM	FISCAL_CODE_VENI	FIRST_NAME	SECOND_NAME	TELEPHONE	EMA
1	CF36	5.00	2021-07-14	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	1	CF34	Jhon	Bush	4563212	bush

Output of the normalization:

CLOSED_TRANSACTION table

ID_LIST	FISCAL_CODE_CUST	FINAL_PRICE	DATETIME
1	CF36	5.00	2021-07-14

LIST TABLE

ID_LIST	START_DATE	END_DATE	START_PRICE	MAXIMUM	COD_ITEM	FISCAL_CODE_VENI
1	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	1	CF34

VENDOR TABLE

FISCAL_CODE	FIRST_NAME	SECOND_NAME	TELEPHONE	EMAIL
CF34	Jhon	Bush	4563212	bush@gmail.com

REVIEW DENORMALIZED TABLE

ID_LIST, FROM,TO are the primary keys

ID_LIST	FROM	TO	MESSAGE	STARS	START_DATE	END_DATE	START_PRICE	MAXIMUM	COD_ITEM
1	CF34	CF36	GOOD CUSTOMER	5	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	1
1	CF36	CF34	GOOD VENDOR,RECO...	5	2021-07-13 23:29:52	2021-07-15 23:29:53	2.00	10	1

MESSAGE,STARTS → (ID_LIST,FROM,TO PRIMARY _KEYS)

START_DATE,END_DATE,START_PRICE,MAXIMUM_PRICE →COD_ITEM → ID_LIST

Output of the normalization process:

REVIEW TABLE

For a specific ID_LIST customer could leave a review.

FROM	TO	ID_LIST	MESSAGE	STARS
CF34	CF36	1	GOOD CUSTOMER	5
CF36	CF34	1	GOOD VENDOR,RECO...	5

LIST TABLE HAS BEEN PREVIOUSLY EXPLAINED.

Mysql DB 3NF schema with foreign keys is shown below: