Art Museum Database

IST 659 Group 3

Overview

Our museum is a new museum that contains 50 pieces of art from 50 of the most influential artists of all time.

Each piece has been recently donated by one of our museum donors, and each piece is appraised for a certain retail value.

We have elected to create a database with all information regarding artworks, the artists, our donors, and the value of each piece of art.

Business Objectives

- Inventory management and appraisal values
- CRM relationships - donor relationships
    - Donor "reward" status
    - Contact information for events
- Construction of exhibits using genres, themes, periods
    - Educational purposes for museum visitors
- CRUD operations on database
    - Ensure smooth updates/deletions to database
- Goal: 3NF Criteria for proper functionality

Data Overview-Artworks

	artwork…	artwork_arti…	artwork_ar…	artwork_t…	artwork_d…	artwork_per…	artwork_ge…	artwork_medi…
1	3	3	Diego Rivera	Paisaje zapat…	1915	Cubism	Pastoral	Oil on canv
2	4	4	Claude Monet	The Water Lil…	1899	Impressionism	Landscape	Oil on canv
3	5	5	Rene Magritte	The Lovers	1928	Surrealism	Symbolic	Oil on canv
4	6	6	Salvador Dali	Dream Caused …	1944	Surrealism	Symbolic	Oil on canv
5	7	7	Edouard Manet	Le Déjeuner s…	1863	Realism	Counterculture	Oil on canv
6	8	8	Andrei Rublev	Trinity	1425	Medieval	Russian Orthod…	Tempera on

```
183  CREATE TABLE Artworks (
184
185      artwork_id INT PRIMARY KEY,
186
187      artwork_artist_id INT,
188
189      artwork_artist VARCHAR(255),
190
191      artwork_title VARCHAR(255),
192
193      artwork_date INT,
194
195      artwork_period VARCHAR(100),
196
197      artwork_genre VARCHAR(100),
198
199      artwork_medium VARCHAR(100),
200
201      FOREIGN KEY (artwork_artist_id) REFERENCES Artists(artist_id)
202
203  );
204
205
206
207  INSERT INTO Artworks (artwork_id, artwork_artist_id, artwork_artist, artwork_title, artwork_date, artwork_period, artwork_genre, artwork_medium) V
208
209  (3, 3, 'Diego Rivera', 'Paisaje zapatista', 1915, 'Cubism', 'Pastoral', 'Oil on canvas'),
210
211  (4, 4, 'Claude Monet', 'The Water Lily Pond', 1899, 'Impressionism', 'Landscape', 'Oil on canvas'),
212
```

Data Overview-Artists

artis…	artist_first…	artist_last…	artist_date_of_…	artist_date_of_…	artist_natio…
1	1	Amedeo	Modigliani	1884	1920	Italian
2	2	Vasiliy	Kandinskiy	1866	1944	Russian
3	3	Diego	Rivera	1886	1957	Mexican
4	4	Claude	Monet	1840	1926	French
5	5	Rene	Magritte	1898	1967	Belgian
6	6	Salvador	Dali	1904	1989	Spanish
7	7	Edouard	Manet	1832	1883	French
8	8	Andrei	Rublev	1360	1430	Russian

```
60   drop table if exists artists
61   go
62   create table artists(
63       artist_id int primary key,
64       artist_first_name varchar(255),
65       artist_last_name varchar(255),
66       artist_date_of_birth INT,
67       artist_date_of_death INT,
68       artist_nationality varchar(100)
69
70   )
71
72
73   INSERT INTO Artists (artist_id, artist_first_name, artist_last_name, artist_date_of_birth, artist_date_of_death, artist_nationality) VALUES
74
75   (1, 'Amedeo', 'Modigliani', 1884, 1920, 'Italian'),
76
77   (2, 'Vasiliy', 'Kandinskiy', 1866, 1944, 'Russian'),
78
79   (3, 'Diego', 'Rivera', 1886, 1957, 'Mexican'),
80
81   (4, 'Claude', 'Monet', 1840, 1926, 'French'),
```

Data Overview-Donors

	Donor ID Numb…	Donor Name	Donor Ema…	Donation Contribut…	Rewards Sta…
1	1	Perla Riley	priley@hotmai…	21100000.00	Platinum Status
2	2	Alicia Marquez	amqz@gmail.com	48000000.00	Platinum Status
3	3	Rowan Mccarthy	mcrowan@hotma…	278000000.00	Diamond Status
4	4	Allison Solom…	alisonsolo@ho…	522000000.00	Diamond Status
5	5	Lamont Morris…	lamontmorriso…	1498500000.00	Diamond Status
6	6	Willow Valent…	willowval@gma…	428000000.00	Diamond Status
7	7	London Charles	londoncharles…	10000000.00	Gold Status
8	8	Tanya Wall	tanyawall@yah…	858000.00	Gold Status
9	9	Melina Clay	claymelina@ho…	12000000.00	Platinum Status

```
18    -- creating the donors table under art database
19    use art
20    GO
21    drop table if exists donors
22    GO
23    create TABLE donors (
24        donor_id int not null,
25        donor_first_name varchar(50) not null,
26        donor_last_name varchar(50) not null,
27        donor_email varchar(50) not null,
28        donor_donated_amount money not NULL,
29        CONSTRAINT pk_donors_donor_id primary KEY (donor_id)
30    )
31    -- inserting data
32    insert into donors
33        (donor_id, donor_first_name, donor_last_name, donor_email, donor_donated_amount)
34        values
35        (1, 'Perla', 'Riley', 'priley@hotmail.com', 21100000),
36        (2, 'Alicia', 'Marquez', 'amqz@gmail.com', 48000000),
37        (3, 'Rowan', 'Mccarthy', 'mcrowan@hotmail.com', 278000000),
38        (4, 'Allison', 'Solomon', 'alisonsolo@hotmail.com', 522000000),
39        (5, 'Lamont', 'Morrison', 'lamontmorrison@gmail.com', 1498500000),
40        (6, 'Willow', 'Valentine', 'willowval@gmail.com', 428000000),
41        (7, 'London', 'Charles', 'londoncharles@hotmail.com', 10000000),
```

Data Overview- Art Value

	art_value_id	art_estimated_value	art_value_category	art_value_status	donor_id
1	1	100000000.00	NULL	Available to Auction	11
2	2	40000000.00	NULL	Unavailable to Auction	14
3	3	14000000.00	NULL	Unavailable to Auction	19
4	4	70400000.00	NULL	Unavailable to Auction	20
5	5	59000000.00	NULL	Unavailable to Auction	3
6	6	10000000.00	NULL	Unavailable to Auction	7

```
331    drop table if exists artvalue
332    go
333    CREATE TABLE artvalue (
334        art_value_id INT PRIMARY KEY,
335        art_estimated_value MONEY,
336        art_value_category VARCHAR(50),
337        art_value_status VARCHAR(50),
338        donor_id INT
339    );
340
341    INSERT INTO artvalue (art_value_id, art_estimated_value, art_art_value_status, donor_id) VALUES
342    ( 1, 100000000, 'Available to Auction', 11),
343    (2, 40000000, 'Unavailable to Auction', 14),
344    (3, 14000000, 'Unavailable to Auction', 19),
345    (4, 70400000, 'Unavailable to Auction', 20),
346    (5, 59000000, 'Unavailable to Auction', 3),
347    (6, 10000000, 'Unavailable to Auction', 7),
```

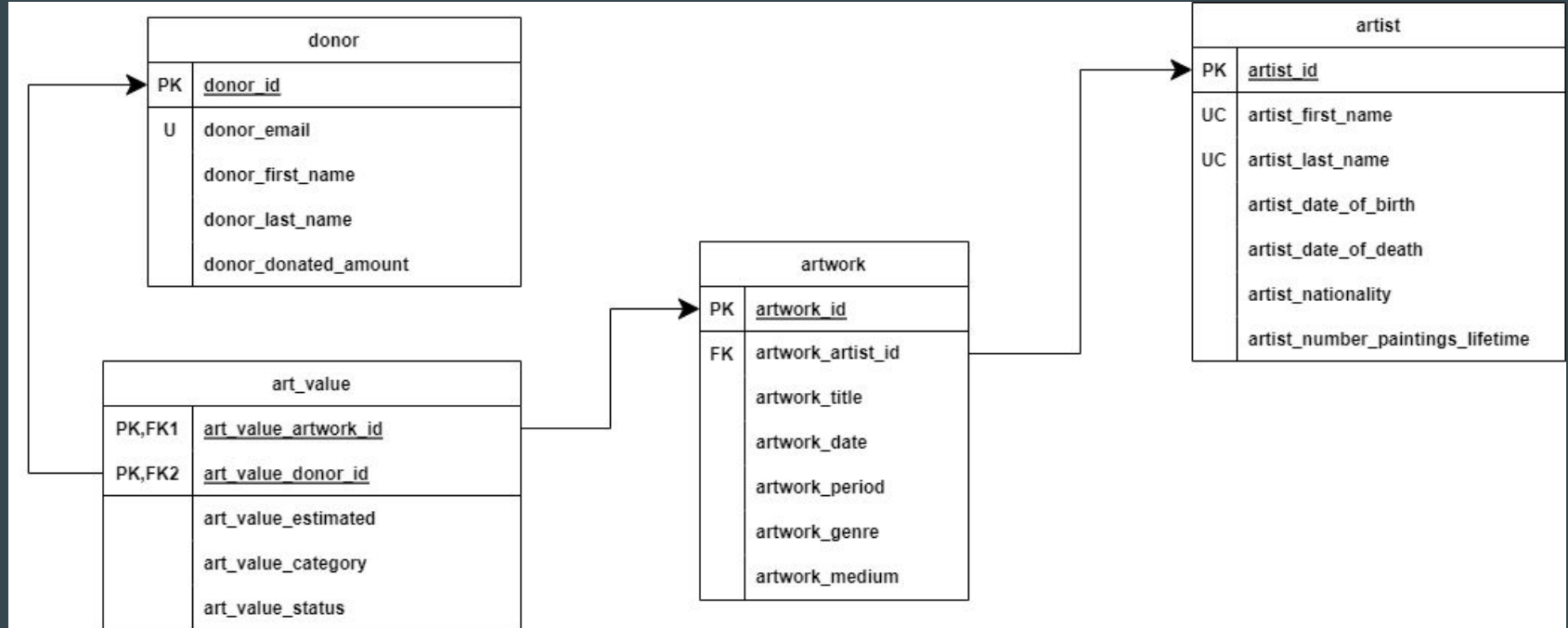| Term	Definition
Check Constraint	A range or limitation set on data to ensure data integrity
Foreign Key (FK)	A column of values in a table that serve as a primary key in another table, or a "key" to allow joining of tables
Referential Integrity	Refers to consistency in data across tables, data is not contradictory
Unique Constraint (U)	Ensures that all data in the column is unique and there are no duplicates.
3NF	The third normal form (format for our tables), which states that all columns are wholly and solely dependent on the primary key. This prevents future data anomalies or errors with input/deletions.
Primary Key (PK)	A column that is a distinctive, unique record for each row to ensure data integrity.
Required (R)	Specifies that the column cannot have non-null values.
Composite (C)	Specifies that the column is composed of 1 of more components.
View	A virtual table based on a result set.
Function	A stored query that receives inputs to produce an output of information.
Trigger	A function that automatically executes when a specific DML (data manipulation) event occurs in the database.
Procedure	Set of code that is saved and stored to run on command.

Conceptual Data Model
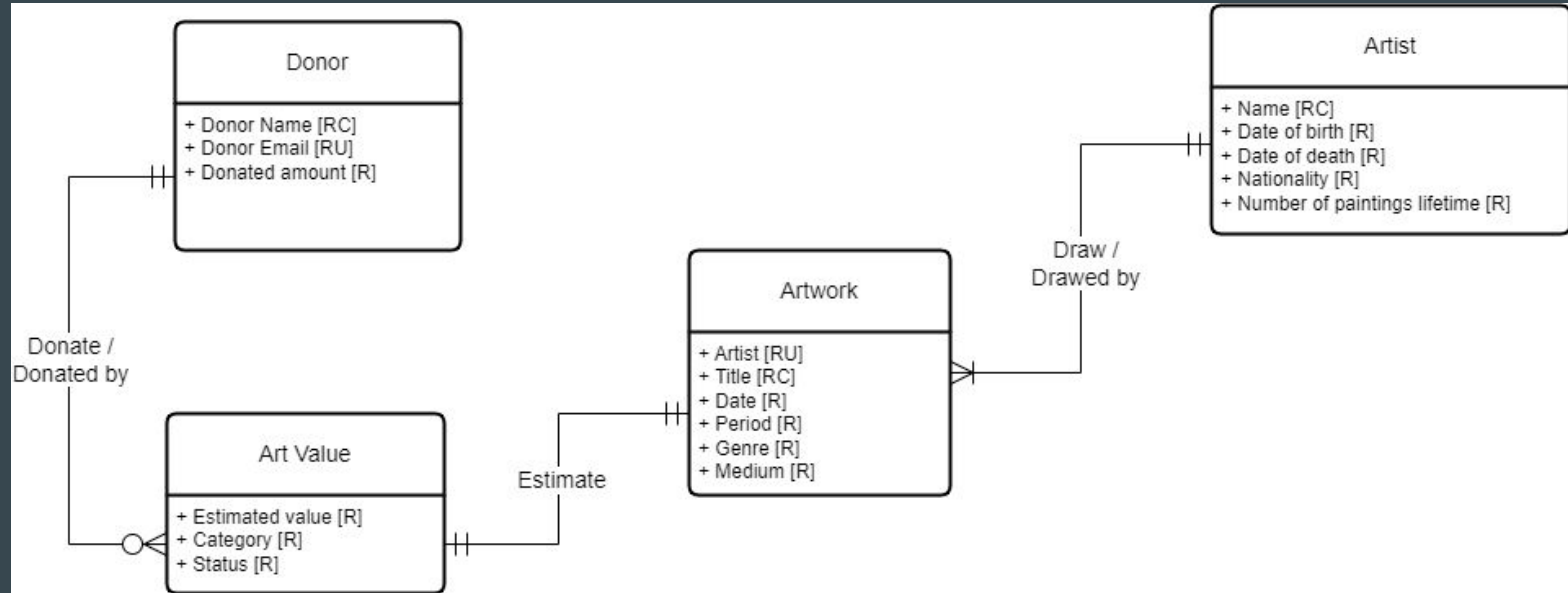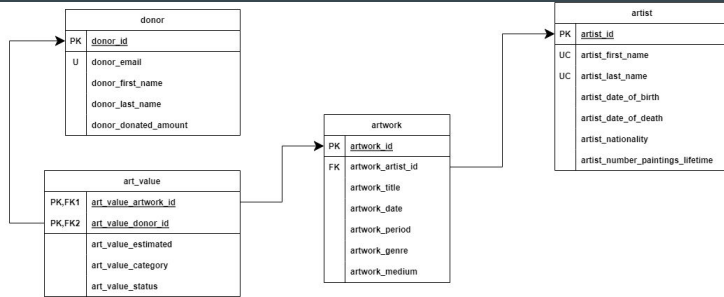
Conceptual Data Model - Data Relationships
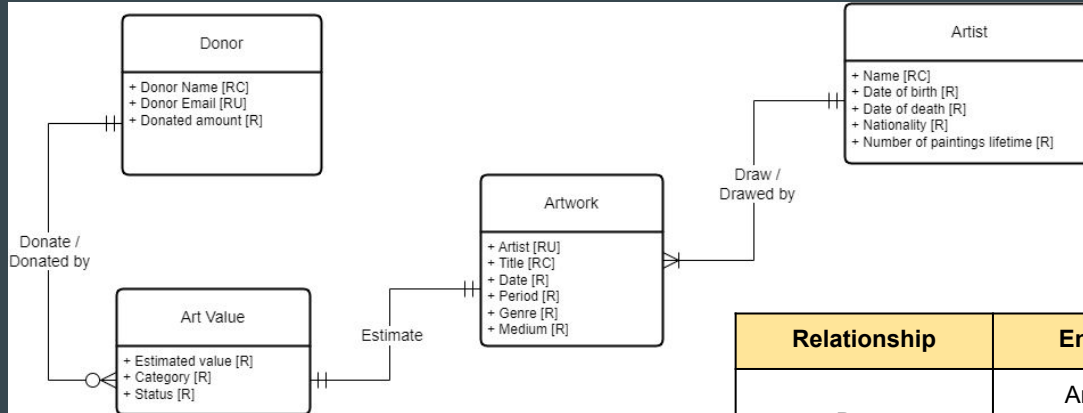
Relationship	Entity	Entity to	Rule	Min	Max
Draw	Artist	Artwork	Draw	1	M
	Artwork	Artist	Drawed by	1	1
Estimate	Artwork	Art Value	Estimate	1	1
	Art Value	Artwork	Estimate	1	1
Donate	Donor	Art Value	Donate	0	M
	Art Value	Donor	Donated by	1	1

Logical Data Model

donor

PK	donor_id
U	donor_email
	donor_first_name
	donor_last_name
	donor_donated_amount

art_value

PK,FK1	art_value_artwork_id
PK,FK2	art_value_donor_id
	art_value_estimated
	art_value_category
	art_value_status

artwork

PK	artwork_id
FK	artwork_artist_id
	artwork_title
	artwork_date
	artwork_period
	artwork_genre
	artwork_medium

artist

PK	artist_id
UC	artist_first_name
UC	artist_last_name
	artist_date_of_birth
	artist_date_of_death
	artist_nationality
	artist_number_paintings_lifetime

Logical Data Model - Artwork Table

Column Name	Data Domain	Comments
artwork_id	PK, RU int	Will be the primary key
artwork_artist_id	FK (artists table), RU int	The artist who drew the artwork
artwork_title	RC varchar(100)	The title of the artwork
artwork_date	R date	The year of the artwork was drawn
artwork_period	R varchar(50)	The period of the artwork
artwork_genre	R varchar(50)	The genre of the artwork
artwork_medium	R varchar(50)	The medium of the artwork

| Constraint Name	Type	Comments
pk_artwork_id	Primary key on artwork_id	Enforces PK over surrogate key on table
fk_artwork_artist_id	Foreign key references artists table	The artist who drawed the artwork
ck_artwork_before_insert	Check constraint or Trigger	Make sure the date of the artwork is not in the future

Logical Data Model - Artists Table
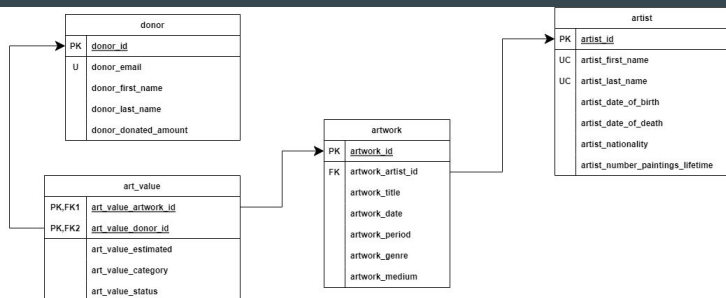
Column Name	Data Domain	Comments
artist_id	PK int	Will be the primary key
artist_first_name	UC varchar(50)	First name of the artist
artist_last_name	UC varchar(50)	Last name of the artist
artist_date_of_birth	R date	The date of birth of the artist
artist_date of death	R date	The date of death of the artist
artist_nationality	R varchar(50)	The nationality of the artist
artist_number_paintings_ lifetime	R int	The number of paintings of the artist for lifetime

| Constraint Name	Type	Comments
pk_artist_id	Primary key on artist_id	Enforces PK over surrogate key on table
u_artist_name	Unique on artist first name and last name	Enforces natural key to establish entity integrity

Logical Data Model - Donors Table
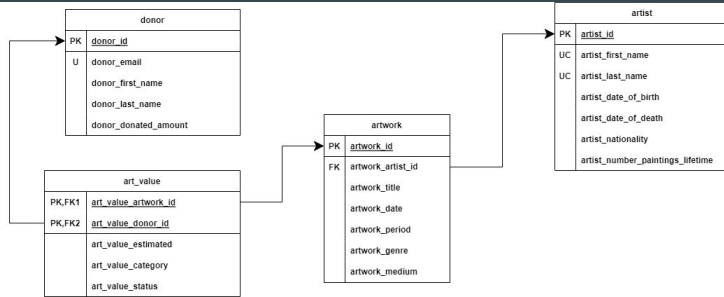
Column Name	Data Domain	Comments
donor_id	PK int	Will be the primary key
donor_email	RU varchar(50)	The email of the donor, Natural key
donor_first_name	R varchar(50)	First name of the donor
donor_last_name	R varchar(50)	Last name of the donor
donor_donated_amount	R money	The amount of donation by the donor

Constraint Name	Type	Comments
pk_donor_id	Primary key on donor_id	Enforces PK over surrogate key on table
u_donor_email	Unique on donor_email	Enforces natural key to establish entity integrity

Logical Data Model - Artvalue Table
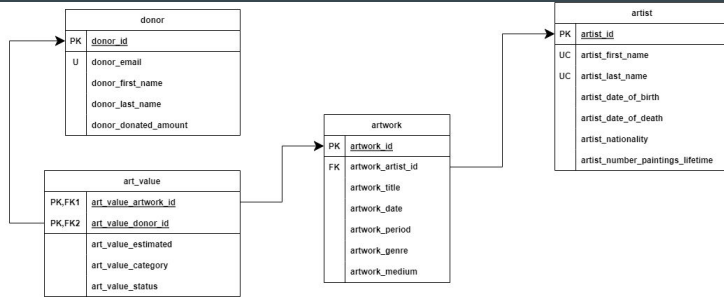
Column Name	Data Domain	Comments
art_value_artwork_id	PK, FK int	Will be the primary key, Foreign key(artwork_id)
art_value_donor_id	PK, FK int	Will be the primary key, Foreign key(donor_id)
art_value_art_estimated	R varchar(50)	The estimated value of the artwork
value_art_category	R check constraint, varchar (15)	The category of the artwork
value_art_status	R varchar(50)	The status of the artwork, Available or not

Constraint Name	Type	Comments
fk_value_artwork_id	Foreign key references artwork table	The artwork which is valued
fk_value_donor_id	Foreign key references donor table	The donor who donated the artwork

Application

1. The list of Artworks

Application

2. Artwork Details with Artwork Value

Application

3. Filtered by Nationality (ex: Italian)
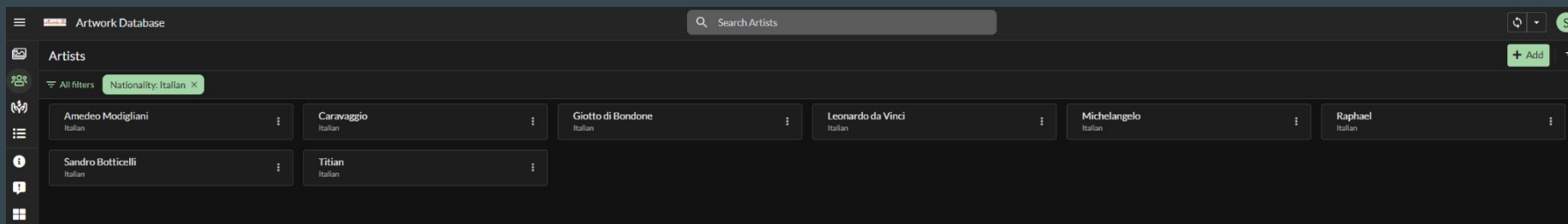
Query 1: **View** Artwork and Artist Nationality

```
398    --FUNCTIONS:
399    --view artist nationality with their artwork
400    GO
401    drop view if exists v_artist_nationality
402
403    GO
404    create view v_artist_nationality AS
405        select a.artist_first_name + ' ' + a.artist_last_name as artist_name,
406                a.artist_date_of_birth, a.artist_date_of_death, a.artist_nationality,
407                w.artwork_title, w.artwork_date, v.art_estimated_value
408            from artists as a
409                join artworks as w on a.artist_id = w.artwork_artist_id
410                join artvalue as v on w.artwork_id = v.art_value_id
411    GO
412
413    select * from v_artist_nationality
```

	artist_name	artist_date_of_birth	artist_date_of_death	artist_nationality	artwork_title
1	Diego Rivera	1886	1957	Mexican	Paisaje zapatista
2	Claude Monet	1840	1926	French	The Water Lily Pond
3	Rene Magritte	1898	1967	Belgian	The Lovers
4	Salvador Dali	1904	1989	Spanish	Dream Caused by the Flight of a
5	Edouard Manet	1832	1883	French	Le Déjeuner sur l'herbe
6	Andrei Rublev	1360	1430	Russian	Trinity
7	Vincent van Gogh	1853	1890	Dutch	Wheatfield with Crows
8	Gustav Klimt	1862	1918	Austrian	Death and Life
9	Hieronymus Bosch	1450	1516	Dutch	The Garden of Earthly Delights

Query 2: **Trigger** to add "Art Value Category" to Art_Value

```sql
415  --artvalue categorization trigger
416  drop trigger if exists t_category_update
417  GO
418  create trigger t_category_update on dbo.artvalue
419  after update
420  as begin
421      update dbo.artvalue
422      set art_value_category = 'Moderate'
423      from dbo.artvalue
424      where art_estimated_value <= 10000000
425
426      update dbo.artvalue
427      set art_value_category = 'High-End'
428      from dbo.artvalue
429      where art_estimated_value between 10000001 and 49999999
430
431      update dbo.artvalue
432      set art_value_category = 'Priceless'
433      from dbo.artvalue
434      where art_estimated_value >= 50000000
435  END
436  GO
437
438  update artvalue set art_estimated_value = '9999999' where art_value_id=2
439  select * from artvalue
```

	art_value_id	art_estimated_value	art_value_category	art_value_status	donor_id
1	1	100000000.00	Priceless	Available to Auction	11
2	2	9999999.00	Moderate	Unavailable to Auction	14
3	3	14000000.00	High-End	Unavailable to Auction	19
4	4	70400000.00	Priceless	Unavailable to Auction	20
5	5	59000000.00	Priceless	Unavailable to Auction	3
6	6	10000000.00	Moderate	Unavailable to Auction	7
7	7	65000000.00	Priceless	Unavailable to Auction	17
8	8	50000000.00	Priceless	Unavailable to Auction	4

Query 3: Retrieve paintings and artists by nationality

```
455   --get all paintings of a nationality
456   GO
457   drop function if exists f_search_nationality
458
459   GO
460   create function f_search_nationality (
461       @keyword as varchar(50)
462       ) RETURNS table as
463       return
464           select * from v_artist_nationality where artist_nationality = @keyword
465   go
466
467   select * from dbo.f_search_nationality('Italian')
468
```

	artist_name	artist_date_of_birth	artist_date_of_death	artist_nationality	artwork_title	artwork_d
1	Giotto di Bondone	1266	1337	Italian	Ognissanti Madonna	1306
2	Sandro Botticelli	1445	1510	Italian	The Birth of Venus	1486
3	NULL	1571	1610	Italian	Judith Beheading Holofernes	1598
4	Leonardo da Vinci	1452	1519	Italian	Mona Lisa	1503
5	NULL	1488	1576	Italian	Venus of Urbino	1534
6	NULL	1483	1520	Italian	The School of Athens	1511
7	NULL	1475	1564	Italian	David	1504

Query 4: Create Donor Rewards System

```sql
317  --creating new column with donor "status levels": diamond ($100M+), platinum ($10M-$100M), and gold ($10M<)
318  select
319      donor_id as 'Donor ID Number',
320      donor_first_name + ' ' + donor_last_name as 'Donor Name',
321      donor_email as 'Donor Email',
322      donor_donated_amount as 'Donation Contributions',
323      case
324          when donor_donated_amount <= 10000000 then 'Gold Status'
325          when donor_donated_amount >= 100000000 then 'Diamond Status'
326          else 'Platinum Status'
327      end as 'Rewards Status'
328  from donors
329
```

Results   Messages

	Donor ID Number	Donor Name	Donor Email	Donation Contributions	Rewards Status
1	1	Perla Riley	priley@hotmail.com	21100000.00	Platinum Status
2	2	Alicia Marquez	amqz@gmail.com	48000000.00	Platinum Status
3	3	Rowan Mccarthy	mcrowan@hotmail.com	278000000.00	Diamond Status
4	4	Allison Solomon	alisonsolo@hotmail.com	522000000.00	Diamond Status
5	5	Lamont Morrison	lamontmorrison@gmail.com	1498500000.00	Diamond Status
6	6	Willow Valentine	willowval@gmail.com	428000000.00	Diamond Status
7	7	London Charles	londoncharles@hotmail.com	10000000.00	Gold Status
8	8	Tanya Wall	tanyawall@yahoo.com	858000.00	Gold Status
9	9	Melina Clay	claymelina@hotmail.com	12000000.00	Platinum Status
10	10	Kaylin Oliver	koliver@gmail.com	100000000.00	Diamond Status
11	11	Ezequiel Boone	ezboone@gmail.com	100000000.00	Diamond Status

Query 5: Procedure Get Artworks By Century

```sql
442    GO
443    create procedure GetArtworksByCentury
444        @century INT
445        AS
446        BEGIN
447            declare @startYear INT, @endYear INT
448            set @startYear = (@century-1)*100
449            set @endYear = @century * 100 -1
450            select artwork_id, artwork_artist, artwork_title, artwork_date, artwork_period, artwork_genre, artwork_medium
451            from artworks
452            where artwork_date between @startYear and @endYear
453        END
454        GO
455
456    EXEC GetArtworksByCentury @century = 20;
```

	artwork_id	artwork_artist	artwork_title	artwork_date	artwork_period
1	3	Diego Rivera	Paisaje zapatista	1915	Cubism
2	5	Rene Magritte	The Lovers	1928	Surrealism
3	6	Salvador Dali	Dream Caused by the Flight of a Bee Around a Pomegranate...	1944	Surrealism
4	10	Gustav Klimt	Death and Life	1910	Art Nouveau
5	12	Kazimir Malevich	Marpha and Van'ka	1929	Suprematism
6	14	Pablo Picasso	The Old Guitarist	1904	Expressionism
7	18	Frida Kahlo	Henry Ford Hospital	1932	Surrealism
8	23	Marc Chagall	Paris Through My Window	1913	Cubism
9	29	Henri Matisse	The Blue Nudes	1952	Modern
10	39	Paul Cezanne	Pyramid of Skulls	1901	Post-Impressionism
11	43	Paul Klee	Castle and Sun	1928	Expressionism
12	44	Piet Mondrian	Composition with Red Blue and Yellow	1930	Neo-Plasticism
13	45	Joan Miro	The Farm	1921	Naïve
14	46	Andy Warhol	Shot Marilyns	1964	Modern
15	50	Jackson Pollock	Number 31	1950	Abstract Expressioni

Conclusion

Improvements to Core Business Operations through our work:

- Customer Relationship Management
    - Donor rewards program
    - Notifying for future events
- Auction Inventory Management
    - Availability and prices
- CRUD
    - Smooth operations
- Event Management
    - Artwork/Artist Data for exhibits curation
- Future roadmap
    - Better adherence to 3NF
    - Further development of database through exhibits, location tables

Questions?