

CPSC 304 Project Cover Page

Milestone #: 4

Date: 6/22/2023

Group Number: 4

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

Project Description:

Our database serves as a platform for art galleries to oversee logistical information about galleries, exhibits, artwork, artists, and customers. Users can add, update, and delete galleries, exhibits, artwork, etc. from the database. Users can also filter the results that appear as well as decide which attributes are displayed. In addition, the application provides the ability to determine useful statistics that give galleries insight into their database. For instance, one can view which artworks are featured in certain exhibits, the number of artworks in each gallery, customers who have visited every exhibit in a gallery, and more.

Changes in Schema:

In the CustomerVisitsExhibit and Visits tables, which previously resulted from normalization, we changed the attribute “time: timestamp” to “date: date” because the date-time format was not compatible with html.

We added “artist_id: integer” as a foreign key in the Art table because it made sense for an artwork to store information about its artist, since every artwork is made by an artist. We previously did not include this attribute because we assumed that an artwork can be made by multiple artists. However, this is not very common, so it was more logical to assume each artwork is made by one artist.

In all tables, we changed all char() inputs to char(255) to make the tables consistent. The only exception was the “description” attribute in the Art table because a description may be longer.

We removed the “email” attribute from the Owner table because most owners were museums or art galleries, so it didn’t make sense to store an email as if the owner was a person.

The Displays table was removed because it didn’t provide any new information.

We decided to separate the Museum table into Museum and Art_Gallery after learning that they differ. This is due to the fact that museums make the majority of profit from customers, while art galleries make profit from selling artwork.

The attributes “state_province” and “postal_code” were added to the Museum and Art_Gallery tables to provide more detail about location.

Schema:

Gallery (gallery_id: integer, name: char(255))

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	gallery_id	name
<input type="checkbox"/>				1	Vancouver Art Gallery
<input type="checkbox"/>				2	The British Museum
<input type="checkbox"/>				3	Canadian Online Art Library
<input type="checkbox"/>				4	Los Angeles County Museum of Art
<input type="checkbox"/>				5	Free Digital Art Gallery
<input type="checkbox"/>				6	National Museum of Modern and Contemporary Art
<input type="checkbox"/>				7	China Art Museum
<input type="checkbox"/>				8	SpaceArtCollection.com
<input type="checkbox"/>				9	Bobs Gallery

Artist (artist_id: integer, birth_year: integer, death_year: integer, name: char(255))

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	artist_id	birth_year	death_year	name
<input type="checkbox"/>				1	1881	1973	Pablo Picasso
<input type="checkbox"/>				2	1452	1519	Leonardo da Vinci
<input type="checkbox"/>				3	1871	1945	Emily Carr
<input type="checkbox"/>				4	1946	NULL	Stephen Lack
<input type="checkbox"/>				5	1941	NULL	Charlie Inukpuk
<input type="checkbox"/>				6	2010	2023	Jay
<input type="checkbox"/>				7	1995	NULL	Sarah Smith

Owner (owner_id: integer, name: char(255))

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	owner_id	name
<input type="checkbox"/>				1	British Museum
<input type="checkbox"/>				2	Bob Richman
<input type="checkbox"/>				3	Canadian Art Society
<input type="checkbox"/>				4	Indigenous Art Gallery
<input type="checkbox"/>				5	Vancouver Art Gallery

Curator (curator_id: integer, name: char(255))

	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	curator_id	name
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	1	Joseph Joestar
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	2	Maruf Aristeides
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	3	Ventsislav Zakaria
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	4	Thorsten Sudhir
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	5	Roddy Włodzimierz

Exhibit (exhibit_id: integer, gallery_id: integer, title: char(255), starting_date: date, ending_date: date)

	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	exhibit_id	gallery_id	title	start_date	end_date
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	1	2	2025 British Museum Back to the Past	2025-04-01	2025-04-06
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	2	1	2026 Winter Picasso Special	2026-11-25	2026-12-25
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	3	6	Tradition meets VR	2025-07-02	2025-07-22
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	4	4	LA Spring Exhibit	2027-03-01	2027-04-30
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	5	7	Meet the Emperor Exhibit	2026-06-01	2026-09-01

Customer (customer_id: integer, name: char(255), price_group: char(255), email: char(255))

	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	customer_id	name	price_group	email
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	1	John Johnson	Adult	JohnJohnson@gmail.com
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	2	Frank Sausage	Adult	SausageFrank@mail.com
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	3	Sarah Kerrigan	Student	heartsoftheswarm@gmail.com
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	4	Dekerd Cain	Senior	diablooldguy@gmail.com
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	5	Dale Falconer	Adult	dalefalconer69@gmail.com
	<input type="checkbox"/>	<input type="checkbox"/>	Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	6	Jay	Child	jay@jay.com

Art (art_id: integer, owner_id: integer, title: char(255), year_created: integer, description: char(4000), exhibit_id: integer, artist_id: integer)

	<input type="button" value="←"/> <input type="button" value="→"/>	<input type="button" value="▼"/>	art_id	owner_id	title	year_created	description	exhibit_id	artist_id
<input type="checkbox"/>		Edit			1	1	Guernica	1937	The grey, black, and white painting, on a canvas 3...
<input type="checkbox"/>		Edit			2	2	The Last Supper	1498	The painting represents the scene of the Last Supp...
<input type="checkbox"/>		Edit			3	3	The Indian Church	1929	The Indian Church is considered a transitional pai...
<input type="checkbox"/>		Edit			4	4	Burnt Kiss	NULL	NULL
<input type="checkbox"/>		Edit			5	5	UNTITLED - CROUCHING HUNTER	NULL	Charlie Inukpuk told Louis Gagnon: When I first st...
<input type="checkbox"/>		Edit			6	5	Man	1982	NULL
<input type="checkbox"/>		Edit			7	3	Man with Seal	1987	NULL
<input type="checkbox"/>		Edit			8	1	Seal Hunter	NULL	a black stone carving of a hunter with seal
<input type="checkbox"/>		Edit			9	2	Mona Lisa	1506	Considered an archetypal masterpiece of the Italia...
<input type="checkbox"/>		Edit			10	3	The Weeping Woman	1937	The Weeping Woman (French: La Femme qui pleure) is...
<input type="checkbox"/>		Edit			11	3	Alien Invasion	2021	Digital creation depicting contact between an unid...
<input type="checkbox"/>		Edit			12	2	Hula Hoop	2016	Kids playing in the sun on a summer day.
<input type="checkbox"/>		Edit			13	4	Stubbed Toe	2008	The pain of squishing a foot against a corner.
<input type="checkbox"/>		Edit			14	2	Electric Boogalooo	2020	It is a true electric boogaloo 2 when it came out.
<input type="checkbox"/>		Edit			15	5	Double Rainbow Triangles	2022	Double Rainbow Triangles? What does it mean?

Makes (artist_id: integer, art_id: integer)

	<input type="button" value="←"/> <input type="button" value="→"/>	<input type="button" value="▼"/>	art_id	artist_id		
<input type="checkbox"/>		Edit			1	1
<input type="checkbox"/>		Edit			10	1
<input type="checkbox"/>		Edit			2	2
<input type="checkbox"/>		Edit			9	2
<input type="checkbox"/>		Edit			3	3
<input type="checkbox"/>		Edit			4	4
<input type="checkbox"/>		Edit			5	5
<input type="checkbox"/>		Edit			6	5
<input type="checkbox"/>		Edit			7	5
<input type="checkbox"/>		Edit			8	5
<input type="checkbox"/>		Edit			14	6
<input type="checkbox"/>		Edit			15	6
<input type="checkbox"/>		Edit			11	7
<input type="checkbox"/>		Edit			12	7
<input type="checkbox"/>		Edit			13	7

Digital ([art_id](#): integer, url: char(255))

			art_id	url				
<input type="checkbox"/>		Edit		Copy		Delete	11	sarahsmith.com/alieninvasion
<input type="checkbox"/>		Edit		Copy		Delete	12	sarahsmith.com/hulahoop
<input type="checkbox"/>		Edit		Copy		Delete	13	sarahsmith.com/stubbedtoe
<input type="checkbox"/>		Edit		Copy		Delete	14	jayart/electricboogaloooooo.com
<input type="checkbox"/>		Edit		Copy		Delete	15	jayart/doublerainbowtriangle.com

Sculpture ([art_id](#): integer, material: char(255), size: char(255))

			art_id	material	size				
<input type="checkbox"/>		Edit		Copy		Delete	4	Bronze	24' x 4' x 9'
<input type="checkbox"/>		Edit		Copy		Delete	5	Stone	9.5" X 10" X 6"
<input type="checkbox"/>		Edit		Copy		Delete	6	Stone	4 1/8" x 7 5/8" x 3 5/8"
<input type="checkbox"/>		Edit		Copy		Delete	7	Stone	7 3/4" x 11 3/8" x 3 3/4"
<input type="checkbox"/>		Edit		Copy		Delete	8	Stone	7" x 8" x 7"

Painting ([art_id](#): integer, dimension: char(255), medium: char(255))

			art_id	dimension	medium				
<input type="checkbox"/>		Edit		Copy		Delete	1	137.4" x 305.5"	Oil on canvas
<input type="checkbox"/>		Edit		Copy		Delete	2	181" x 346"	Tempera on gesso, pitch, and mastic
<input type="checkbox"/>		Edit		Copy		Delete	3	42.8" x 27.1"	Oil on canvas
<input type="checkbox"/>		Edit		Copy		Delete	9	30" x 21"	Oil on poplar panel
<input type="checkbox"/>		Edit		Copy		Delete	10	23 15/60" x 19 11/16"	Oil on canvas

Museum ([gallery_id](#): integer, address: char(255), city: char(255), state_province: char(255), postal_code: char(255), country: char(255))

			gallery_id	address	city	state_province	postal_code	country				
<input type="checkbox"/>		Edit		Copy		Delete	2	Great Russell St	London	NULL	WC1B 3DG	The United Kingdom of Great Britain and Northern I...
<input type="checkbox"/>		Edit		Copy		Delete	4	5905 Wilshire Blvd	Los Angeles	CA	90036	United States of America
<input type="checkbox"/>		Edit		Copy		Delete	6	30 Samcheong-ro 5-gil, Jongno-gu	Seoul	NULL	NULL	Republic of Korea
<input type="checkbox"/>		Edit		Copy		Delete	7	205 Shangnan Road	Shanghai	NULL	200010	China

Art_Gallery ([gallery_id](#): integer, address: char(255), city: char(255), state_province: char(255), postal_code: char(255), country: char(255))

			gallery_id	address	city	state_province	postal_code	country				
<input type="checkbox"/>		Edit		Copy		Delete	1	750 Hornby St	Vancouver	BC	V6Z 2H7	Canada

Virtual_Art_Gallery ([gallery_id](#): integer, url: char(255))

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	gallery_id	url
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	3	COAL.com
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	5	FreeDigitalArtGallery.com
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	8	SpaceArtCollection.com
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	9	BobsArtHaven.com

Manages (curator_id: integer, gallery_id: integer, starting_date: date)

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	curator_id	gallery_id	starting_date
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	1	1	2013-11-15
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	2	2	1999-04-21
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	3	3	2000-02-21
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	4	1998-12-25
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	7	2020-12-12
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	5	5	2020-01-01
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	5	6	2022-03-01

Oversees (curator_id: integer, exhibit_id: integer)

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	curator_id	exhibit_id
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	2	1
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	1	2
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	5	3
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	4
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	5

Transfers (art_id: integer, origin: integer, destination: integer, date: date)

	<input type="button" value="←"/>	<input type="button" value="→"/>	▼	art_id	origin	date	destination
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	1	1	2021-09-10	2
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	2	2	1924-08-13	3
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	3	3	1999-06-17	2
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	3	2023-03-19	4
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	4	1966-07-16	1
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	5	2	2022-04-02	1
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	6	1	2001-05-03	2
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	11	5	1852-02-23	2
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	12	5	2024-01-27	3

CustomerVisitsExhibit ([customer_id](#): integer, [date](#): date, [exhibit_id](#): integer)

			customer_id	date	exhibit_id
Click the drop-down arrow to toggle column's visibility.					
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	2022-04-02
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	2022-04-01
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	2022-04-12
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	2022-04-03
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	2022-11-20
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	2022-11-30
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	2022-11-12
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	2022-07-21
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	2022-03-15
<input type="checkbox"/>	 Edit	 Copy	 Delete	5	2022-08-03

ExhibitCharges ([exhibit_id](#): integer, [price](#): integer, [price_group](#): char(255))

			exhibit_id	price	price_group
Click the drop-down arrow to toggle column's visibility.					
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	25 Senior
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	40 Student
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	50 Adult
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	25 Senior
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	40 Student
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	50 Adult
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	25 Senior
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	40 Student
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	50 Adult
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	25 Senior
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	40 Student
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	50 Adult
<input type="checkbox"/>	 Edit	 Copy	 Delete	5	25 Senior
<input type="checkbox"/>	 Edit	 Copy	 Delete	5	40 Student
<input type="checkbox"/>	 Edit	 Copy	 Delete	5	50 Adult

Visits ([customer_id](#): integer, [exhibit_id](#): integer, [date](#): date, [price](#): integer)

			customer_id	exhibit_id	date	1	price
<input type="checkbox"/>		Edit			Delete	4	4 2022-03-15 25
<input type="checkbox"/>		Edit			Delete	2	1 2022-04-01 50
<input type="checkbox"/>		Edit			Delete	1	1 2022-04-02 50
<input type="checkbox"/>		Edit			Delete	4	1 2022-04-03 50
<input type="checkbox"/>		Edit			Delete	3	1 2022-04-12 50
<input type="checkbox"/>		Edit			Delete	3	3 2022-07-21 40
<input type="checkbox"/>		Edit			Delete	5	5 2022-08-03 50
<input type="checkbox"/>		Edit			Delete	3	2 2022-11-12 50
<input type="checkbox"/>		Edit			Delete	1	2 2022-11-20 50
<input type="checkbox"/>		Edit			Delete	2	2 2022-11-30 50

SQL Queries:

Insert new gallery:

```
INSERT INTO Gallery (name) VALUES ('Test Museum');
INSERT INTO Museum VALUES (@last_id, '750 Test St', 'Vancouver', 'BC', 'V67 2HZ',
'Canada');
```

Selection of galleries:

```
SELECT 'Museum' AS 'type', g1.gallery_id, g1.name, address, city, state_province,
postal_code, country, NULL AS url
FROM Gallery g1, Museum m
WHERE g1.gallery_id = m.gallery_id AND (g1.gallery_id LIKE '%%' OR g1.name LIKE '%%')
UNION
SELECT 'Art Gallery' AS 'type', g2.gallery_id, g2.name, address, city, state_province,
postal_code, country, NULL AS url
FROM Gallery g2, Art_Gallery a
WHERE g2.gallery_id = a.gallery_id AND (g2.gallery_id LIKE '%%' OR g2.name LIKE '%%')
UNION
SELECT 'Virtual Art Gallery' AS 'type', g3.gallery_id, g3.name, NULL AS address, NULL AS city,
NULL AS state_province, NULL AS postal_code, NULL AS country, url
FROM Gallery g3, Virtual_Art_Gallery v
WHERE g3.gallery_id = v.gallery_id AND (g3.gallery_id LIKE '%%' OR g3.name LIKE '%%');
```

Projection of galleries:

```
SELECT 'Art Gallery' AS 'type', g2.gallery_id, g2.name, address
FROM Gallery g2, Art_Gallery a
WHERE g2.gallery_id = a.gallery_id AND (g2.gallery_id LIKE '%%' OR g2.name LIKE '%%')
UNION
```

```
SELECT 'Virtual Art Gallery' AS 'type', g3.gallery_id, g3.name, NULL AS address
FROM Gallery g3, Virtual_Art_Gallery v
WHERE g3.gallery_id = v.gallery_id AND (g3.gallery_id LIKE '%%' OR g3.name LIKE '%%');
```

Edit button in View Galleries:

```
UPDATE Gallery
SET name = 'Test Museum'
WHERE gallery_id = 12;
```

UPDATE Museum:

```
SET address = '750 Test St', city = 'Vancouver', state_province = 'WA', postal_code = 'V67 2HZ',
country = 'Washington'
WHERE gallery_id = 12;
```

Delete button in View Galleries:

```
DELETE FROM Gallery WHERE gallery_id = 12;
```

Join Query (between Art, Artist, and Exhibit):

```
SELECT art1.art_id, art1.title AS art_title, owner1.name AS owner_name, artist1.name AS
artist_name, artist1.birth_year, artist1.death_year, exhibit1.title AS exhibit_title, gallery1.name
AS gallery_name
FROM Art art1, Artist artist1, Owner owner1, Exhibit exhibit1, Gallery gallery1
WHERE art1.artist_id = artist1.artist_id AND art1.owner_id = owner1.owner_id AND
art1.exhibit_id = exhibit1.exhibit_id AND exhibit1.gallery_id = gallery1.gallery_id AND (art1.title
LIKE '%%' OR art1.art_id LIKE '%%') AND (art1.artist_id = 1 OR art1.artist_id = 2)
UNION
SELECT art1.art_id, art1.title AS art_title, owner1.name AS owner_name, artist1.name AS
artist_name, artist1.birth_year, artist1.death_year, NULL as exhibit_title, NULL as gallery_name
FROM Art art1, Artist artist1, Owner owner1
WHERE art1.artist_id = artist1.artist_id AND art1.owner_id = owner1.owner_id AND
art1.exhibit_id IS NULL AND (art1.title LIKE '%%' OR art1.art_id LIKE '%%') AND (art1.artist_id
= 1 OR art1.artist_id = 2);
```

Aggregation w/ Group By: A user can select a gallery to see how many artworks are in it.

```
SELECT g.gallery_id, g.name, Count(a.art_id) AS num_artworks
FROM Art a, Exhibit e, Gallery g
WHERE a.exhibit_id = e.exhibit_id AND e.gallery_id = g.gallery_id AND (e.gallery_id = 1 OR
e.gallery_id = 2)
GROUP BY e.gallery_id;
```

Aggregation w/ Having: A user can view the number of customers in exhibits with a minimum number of customers set by the user.

```
SELECT v.exhibit_id, title, Count(customer_id) AS num_customers
FROM Visits v, Exhibit e
```

```
WHERE v.exhibit_id = e.exhibit_id  
GROUP BY v.exhibit_id HAVING Count(*) >= 3;
```

Nested Aggregation: Find the average birth year of artists who have made artworks older than the average age of all artworks in a gallery.

```
SELECT AVG(birth_year) AS avg_birth_year  
FROM Artist m  
WHERE m.artist_id IN (SELECT DISTINCT m1.artist_id  
                      FROM Art a, Artist m1, Exhibit e, Gallery g  
                      WHERE a.artist_id = m1.artist_id AND a.exhibit_id = e.exhibit_id  
                            AND e.gallery_id = g.gallery_id AND  
                            a.year_created < (SELECT AVG(a2.year_created)  
                                      FROM Art a2, Exhibit e2, Gallery g2  
                                      WHERE a2.exhibit_id = e2.exhibit_id AND  
                                            e2.gallery_id = g2.gallery_id AND  
                                            g2.gallery_id = 1));
```

Division: A user can select a gallery and see which customers have visited every exhibit in that gallery.

```
SELECT c.customer_id, c.name  
FROM Customer c  
WHERE NOT EXISTS ((SELECT exhibit_id FROM Exhibit  
                      WHERE gallery_id = 1)  
EXCEPT  
                  (SELECT exhibit_id FROM Visits v  
                      WHERE v.customer_id = c.customer_id));
```

Screenshots of Sample Output:

Inserting a Gallery:

Register a Gallery

Type: Museum Art Gallery Virtual Art Gallery

Name (required):

Address:

City:

State/Province:

Postal Code:

Country:

Register a Gallery

Type: Museum Art Gallery Virtual Art Gallery

Name (required):

Address:

City:

State/Province:

Postal Code:

Country:

Test Museum successfully registered!

Selection of Galleries:

View Galleries

Search:

Filter by: Museum Art Gallery Virtual Art Gallery

Display: Address City State/Province Postal Code Country URL

Type	ID #	Name	Address	City	State/Province	Postal Code	Country	URL	Actions
Museum	2	The British Museum	Great Russell St	London		WC1B 3DG	The United Kingdom of Great Britain and Northern Ireland		<input type="button" value="Edit"/> <input type="button" value="Delete"/>
Museum	4	Los Angeles County Museum of Art	5905 Wilshire Blvd	Los Angeles	CA	90036	United States of America		<input type="button" value="Edit"/> <input type="button" value="Delete"/>
Museum	6	National Museum of Modern and Contemporary Art	30 Samcheong-ro 5-gil, Jongno-gu	Seoul			Republic of Korea		<input type="button" value="Edit"/> <input type="button" value="Delete"/>
Museum	7	China Art Museum	205 Shangnan Road	Shanghai		200010	China		<input type="button" value="Edit"/> <input type="button" value="Delete"/>
Museum	12	Test Museum	750 Test St	Vancouver	BC	V6Z 2HZ	Canada		<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Projection of Galleries:

View Galleries

Search:

Filter by: Museum Art Gallery Virtual Art Gallery

Display: Address City State/Province Postal Code Country URL

Type	ID #	Name	Address	Actions	
Art Gallery	1	Vancouver Art Gallery	750 Hornby St	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Virtual Art Gallery	3	Canadian Online Art Library		<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Virtual Art Gallery	5	Free Digital Art Gallery		<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Virtual Art Gallery	8	SpaceArtCollection.com		<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Virtual Art Gallery	9	Bobs Gallery		<input type="button" value="Edit"/>	<input type="button" value="Delete"/>

Updating gallery entry:

Museum	12	<input type="text" value="Test Museum"/>	<input type="text" value="750 Test S:"/>	<input type="text" value="Vancou"/>	<input type="text" value="BC"/>	<input type="text" value="V67 2F"/>	<input type="text" value="Canada"/>	<input type="button" value="Update"/>	<input type="button" value="Cancel"/>
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Museum	12	<input type="text" value="Test Museum"/>	<input type="text" value="750 Test S:"/>	<input type="text" value="Vancou"/>	<input type="text" value="WA"/>	<input type="text" value="V67 2F"/>	<input type="text" value="Washington"/>	<input type="button" value="Update"/>	<input type="button" value="Cancel"/>
--------	----	--	--	-------------------------------------	---------------------------------	-------------------------------------	---	---------------------------------------	---------------------------------------

Museum	6	National Museum of Modern and Contemporary Art	30	Seoul	Republic of Korea	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Gallery successfully updated.							
Museum	7	China Art Museum				<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
Museum	12	<input type="text" value="Test Museum"/>	<input type="text" value="750 Test S:"/>	<input type="text" value="Vancou"/>	<input type="text" value="WA"/>	<input type="text" value="V67 2F"/>	<input type="text" value="Washington"/>

Deleting a gallery:

Museum	6	National Museum of Modern and Contemporary Art	53 Samcheong-ro	Seoul	Republic of Korea	Edit	Delete		
Museum	7	China Art Museum	53 Samcheong-ro	Beijing	China	Edit	Delete		
Museum	12	Test Museum	750 Test St	Vancouver	WA	V67 2HZ	Washington	Edit	Delete

Gallery successfully deleted.

[Close](#)

Join Query (between Art, Artist, and Exhibit):

View Artworks

See registered artworks along with information about their artists and current exhibits.

Search:	<input type="text" value="Enter an artwork title or ID #"/>	
Filter by:	Year Created:	<input type="text" value="e.g., 2023"/>
Artist(s):	Pablo Picasso Leonardo da Vinci Emily Carr Stephen Lack	
Owner(s):	British Museum Bob Richman Canadian Art Society Indigenous Art Gallery	
Exhibit(s):	2026 Winter Picasso Special Tradition meets VR LA Spring Exhibit Meet the Emperor Exhibit	

Use Ctrl/Cmd to select multiple options.

Display:	Artwork:	<input checked="" type="checkbox"/> Title	<input type="checkbox"/> Year	<input type="checkbox"/> Description	<input checked="" type="checkbox"/> Owner
	Artist:	<input checked="" type="checkbox"/> Name		<input checked="" type="checkbox"/> Birth Year	<input checked="" type="checkbox"/> Death Year
	Exhibit:	<input checked="" type="checkbox"/> Title	<input checked="" type="checkbox"/> Gallery	<input type="checkbox"/> Start Date	<input type="checkbox"/> End Date

[Search Artworks](#)

ID #	Art	Owner	Artist	Birth	Death	Exhibit	Gallery	Actions
1	Guernica	British Museum	Pablo Picasso	1881	1973	2026 Winter Picasso Special	Vancouver Art Gallery	Delete
2	The Last Supper	Bob Richman	Leonardo da Vinci	1452	1519	2025 British Museum Back to the Past	The British Museum	Delete
9	Mona Lisa	Bob Richman	Leonardo da Vinci	1452	1519	2025 British Museum Back to the Past	The British Museum	Delete
10	The Weeping Woman	Canadian Art Society	Pablo Picasso	1881	1973	2026 Winter Picasso Special	Vancouver Art Gallery	Delete

Aggregation w/ Group By Query:

Find the number of artworks in a gallery:

Gallery(s):

Vancouver Art Gallery
The British Museum
Canadian Online Art Library
Los Angeles County Museum of Art

Use Ctrl/Cmd to select multiple options.

Find

Gallery ID #	Gallery Name	Number of Artworks
1	Vancouver Art Gallery	2
2	The British Museum	3

Aggregation w/ Having Query:

Find the number of customers in exhibits that have had a minimum number of customers:

Customers:

3

Find

Exhibit ID #	Exhibit Title	Number of Customers
1	2025 British Museum Back to the Past	4
2	2026 Winter Picasso Special	3

Nested Aggregation Query:

Find the average birth year of artists who have made artworks older than the average age of all artworks in a gallery:

Gallery:

Vancouver Art Gallery

Find

Average birth year: 1661.5

Gallery:

The British Museum

Find

Average birth year: 1452

Division Query:

Find customers who have visited every exhibit at a gallery:

Gallery: Vancouver Art Gallery

Find

Customer ID #	Customer Name
1	John Johnson
2	Frank Sausage
3	Sarah Kerrigan