

Relational Model

Schema

work
<u>id</u>
category
medium
photoUrl
year
galleryID
artistID

Attribute Type Legend

- - table header
- - int/integer
- - string
- - primary key
- - foreign key → source

artist
<u>id</u>
name
Birthday
location

gallery
<u>id</u>
name
location

location
<u>id</u>
city
country

Relations

work (id, category, medium, photoUrl, year, galleryID, artistID)
artist (id, name, birthday, location)
gallery (id, name, location)
location (id, city, country)

Constraints & Domain

• work

- **id** - $D: \{ \text{null}, 1, 2, 3, \dots, \infty \}$, unique, null implicit but not allowed
- **category** - $D: \{ \text{null}, \text{renaissance}, \text{cubist}, \text{classical}, \text{post-modern} \}$, not unique, null allowed
- **medium** - $D: \{ \text{clay}, \text{canvas}, \text{oil}, \text{audio}, \text{photo}, \text{marble}, \text{wax} \}$, not unique, null not allowed
- **photoUrl** - $D: \{ \text{null}, \text{http://xxx.imgext} \}$, unique, null allowed
- **year** - $D: \{ \text{null}, 1000, 1001, \dots, 2017 \}$, not unique, null allowed
- **galleryID** - $D: \{ \text{null}, 1, 2, \dots, 5 \}$, not unique, null not allowed
- **artistID** - $D: \{ \text{null}, \text{Picasso}, \text{Picasso}, \dots, \infty \}$, not unique, null ^{not} allowed

• artist

- **id** - $D: \{ \text{null}, 1, 2, 3, \dots, \infty \}$ unique, null not allowed
- **name** - $D: \{ \text{null}, \text{Picasso}, \dots, \infty \}$ ^{not} unique, null allowed
- **Birthday** - $D: \{ \text{null}, 20170201, \dots, 00000000 \}$ not unique, null allowed
- **location** - $D: \{ \text{null}, 1, 2, \dots, \infty \}$ not unique, null not allowed

• gallery

- **id** - $D: \{ \text{null}, 1, 2, \dots, 5 \}$ unique, null not allowed
- **name** - $D: \{ \text{null}, \text{Louvre}, \text{etc.} \}$ not unique, null not allowed
- **location** - $D: \{ \text{null}, 1, 2, \dots, \infty \}$ not unique, null not allowed

• location

- **id** - $D: \{ \text{null}, 1, 2, \dots, \infty \}$, unique, null not allowed
- **city** - $D: \{ \text{null}, \text{Paris}, \text{etc.} \}$, not unique, null not allowed
- **country** - $D: \{ \text{null}, \text{France}, \text{etc.} \}$, not unique, null not allowed

Normalization

① work (id, category, medium, photoUrl, year, galleryID, artistID)

• 1NF

Q. Is every element atomic?

A. - In reference to the constraints & Domain page, none of the domains of the attributes in work require multiple values. This means all the domains are atomic/indivisible.

✓ This is 1NF

• 2NF

Q. Do any non-key attributes depend on only parts of the primary key?

A. - The functional dependency is: $FD1 \text{ id} \rightarrow \text{category, medium, photoUrl, year, galleryID, artistID}$

- we have a single FD. All attributes depend only on it

✓ This is 2NF

• 3NF

Q. Are there any attributes which are ~~antecedents~~^{dependant} on a non-key attribute?

A. - id is a superkey for work

✓ This is 3NF

• BCNF

Q. Is there any redundancy in functional dependencies?

A. - id is a superkey for work

✓ This is BCNF

(questions are the same as those asked on page 1)

2) artist (id, name, birthday, location)

• 1NF

A. - In reference to the constraints & Domain page, none of the domains of the attributes in work require multiple values.
This means all the domains are atomic/indivisible.

✓ This is in 1NF

• 2NF

A. - The functional dependency is: $FD1 \overset{id}{\cancel{artist}} \rightarrow name, birthday, location$
- Single FD. All attributes depend only on it.

✓ This is in 2NF

• 3NF

A. - id is a superkey for artist

✓ This is in 3NF

• BCNF

A. - id is a superkey for artist

✓ This is in BCNF

③ gallery(id, name, location)

• 1NF

A. - No domains of attributes require multiple values. All are indivisible.

✓ This is in 1NF

• 2NF

A. - FD is : $FD \mid id \rightarrow name, location$. Single FD.

✓ This is in 2NF

• 3NF

A. - id is a superkey for gallery

✓ This is in 3NF

• BCNF

A. - id is a superkey for gallery

✓ This is in BCNF

④ location(id, city, country)

• 1NF

A. - No domains of attributes require multiple values. All are indivisible.

✓ This is in 1NF

• 2NF

A. - FD is : $FD \mid id \rightarrow city, country$. Single FD

✓ This is in 2NF

• 3NF

A. id is a superkey for location

✓ This is in 3NF

• BCNF

A. id is a superkey for location

✓ This is in BCNF