|  |  |  |  |
| --- | --- | --- | --- |
| ***Domain*** | ***Type*** | ***Attributes that uses this domain*** | ***Description*** |
| ns\_inName | varchar(50) | ns\_in\_inName  ns\_wk\_inName  ns\_lc\_inName  ns\_ex\_inName  ns\_tr\_inName  ns\_tr\_inNameReceiver  ns\_tr\_inNameGiver  ns\_wo\_inName  ns\_wo\_inNameOwner  ns\_wl\_inName  ns\_we\_inName  ns\_el\_inName  ns\_wv\_inName  ns\_ws\_inName  ns\_wm\_inName  ns\_ld\_inName | This domain is the type for the name of the institutions that the museum will associate to, including the museum itself. Because institution’s name exists in most of the tables and act as a part of the primary key and foreign key in those tables. And because the longest institution name from the team members is 50, so, this domain restriction will be 50. |
| ns\_email | varchar(100) | ns\_in\_email | This domain is the type for attribute that is the email of the institutions for contact. It will only be used once in the institution table. And because some possible email address can be 100 characters, so, this domain restriction will be 100. |
| ns\_phoneNumber | varchar(20) | ns\_in\_phoneNumber | This domain is the type for attribute that is the phone number of the institutions for contact. It will only be used once in the institution table. It is a set of string rather than a regular number. And because the phone number form can have at most 20 characters, so, this domain restriction will be 20. |
| ns\_streetAddress | varchar(50) | ns\_in\_streetAddress  ns\_lc\_StreetAddress | The domain type for the street address of the institution which is a part of its contact information. Because the locations for travelling exhibitions also possess this trait, the location table will also use this domain. And because the longest street address from the team members is 50, so, this domain restriction will be 50. |
| ns\_city | varchar(60) | ns\_in\_city  ns\_lc\_city | The domain type for the city of the institution which is a part of its contact information. Because the locations for travelling exhibitions also possess this trait, the location table will also use this domain. And because the longest city name on the world is 58, so, this domain restriction will be 60. |
| ns\_countrySubdivision | varchar(20); | ns\_in\_countrySubdivision  ns\_lc\_countrySubdivision | The domain type for the state/province of the institution which is a part of its contact information. Because the locations for travelling exhibitions also possess this trait, the location table will also use this domain. And because the longest country name from the team members is 20, so, this domain restriction will be 20. |
| ns\_country | varchar(20) | ns\_in\_country  ns\_lc\_country | The domain type for the country of the institution which is a part of its contact information. Because the locations for travelling exhibitions also possess this trait, the location table will also use this domain. And because the longest country name from the team members is 20, so, this domain restriction will be 20. |
| ns\_postalcode | varchar(50) | ns\_in\_postalCode  ns\_lc\_postalCode | The domain type for the postal code of the institution which is a part of its contact information. Because the locations for travelling exhibitions also possess this trait, the location table will also use this domain. And because there will be longer postal code in the future, this domain restriction will be 50. |
| ns\_IDAlpha | varchar(10) | ns\_wk\_IDAlpha  ns\_tr\_IDAlpha  ns\_tr\_IDAlphaOther  ns\_wo\_IDAlpha  ns\_wl\_IDAlpha  ns\_we\_IDAlpha  ns\_wv\_IDAlpha  ns\_ws\_IDAlpha  ns\_wm\_IDAlpha | The domain for the id-alpha, which is one part of the identification key for the items. The attribute using this domain will all be on the part of the primary key and foreign key in theirs, so all tables that associate with the items will use this domain. And because the longest id-alpha from the team members is 10, so, this domain restriction will be 10. |
| ns\_IDNumeric | interger | ns\_wk\_IDNumeric  ns\_tr\_IDNumeric  ns\_tr\_ns\_IDNumericOther  ns\_wo\_IDNumeric  ns\_wl\_IDNumeric  ns\_we\_IDNumeric  ns\_wv\_IDNumeric  ns\_ws\_IDNumeric  ns\_wm\_IDNumeric | The domain for the id-number, which is one part of the identification key for the items. The attribute using this domain will all be on the part of the primary key and foreign key in theirs, so all tables that associate with the items will use this domain. And one of the member used long integer, therefore this domain type will be integer. |
| ns\_wkName | varchar(200) | ns\_wk\_wkName | This domain is the type for the work name. It will only be used in the work table. And because the longest work name from the team members is 200, so, this domain restriction will be 200. |
| ns\_creator | varchar(50) | ns\_wk\_creator | This domain is the type for the creator of the work’s name. It will only be used in the work table. And because the longest creator name from the team members is 50, so, this domain restriction will be 50. |
| ns\_coDate | date | ns\_wk\_coDate | This domain is the type for the completion date of the work. It will only be used in the work table. |
| ns\_acDate | date | ns\_wk\_acDate | This domain is the type for the date the museum acquire work. It will only be used in the work table. |
| ns\_wkDescription | text | ns\_wk\_wkDescription | This domain is the type for the work name. It will only be used in the work table. And its type will be a text. |
| ns\_theme | varchar(50) | ns\_wk\_theme | This domain is the type for the theme of the work. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. Because the longest theme from the team members is 50, so, this domain restriction will be 50. |
| ns\_subject | varchar(50) | ns\_wk\_subject | This domain is the type for the subject of the work. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. Because the longest subject from the team members is 50, so, this domain restriction will be 50. |
| ns\_culture | varchar(50) | ns\_wk\_culture | This domain is the type for the culture of the work. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. Because the longest culture from the team members is 50, so, this domain restriction will be 50. |
| ns\_colour | varchar(50) | ns\_wk\_colour | This domain is the type for the colour of the work. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. This domain restriction will be 50 to mark the same as others type/subtype. |
| ns\_carType | varchar(50) | ns\_wk\_carType | This domain is the type for the car type of the work because one member has a car museum. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. This domain restriction will be 50 to mark the same as others type/subtype. |
| ns\_transmission | varchar(50) | ns\_wk\_transmission | This domain is the type for the car transmission type of the work because one member has a car museum. It will only be used in the work table. This domain was used to be called type/subtype, but due to the combination of team members database, it need to be changed to something more meaningful. This domain restriction will be 50 to mark the same as others type/subtype. |
| ns\_lcName | varchar(58) | ns\_lc\_lcName  ns\_wl\_lcName  ns\_el\_lcName  ns\_ld\_lcName1  ns\_ld\_lcName2 | This domain is the type for the name of the locations that the museum has. Because the location name will act as a part of the primary key and in location table, the other tables that associate with the locations information will also use this domain for its attribute. And because the longest location name from the team members is 58, so, this domain restriction will be 58. |
| ns\_length | real | ns\_lc\_length | This domain is the type for the length of the museum’s location. It will only be used in the location table. |
| ns\_height | real | ns\_lc\_height | This domain is the type for the height of the museum’s location. It will only be used in the location table. |
| ns\_width | real | ns\_lc\_width | This domain is the type for the width of the museum’s location. It will only be used in the location table. |
| ns\_minNumWorks | smallint | ns\_lc\_minNumWorks | This domain is the type for the minimum work capacity of the museum’s location. It will only be used in the location table. |
| ns\_maxNumWorks | smallint | ns\_lc\_maxNumWorks | This domain is the type for the maximum work capacity of the museum’s location. It will only be used in the location table. |
| ns\_availabilityDate | date | ns\_lc\_availabilityDate | This domain is the type for the date that the museum will be available. It will only be used in the location table. |
| ns\_sponsor | varchar(50) | ns\_lc\_sponsor | This domain is the type for the sponsor of the traveling exhibition, which will use the temporary locations. It will only be used in the location table. |
| ns\_security | varchar(50) | ns\_lc\_security | This domain is the type for the security of the traveling exhibition, which will use the temporary locations. It will only be used in the location table. |
| ns\_insurance | integer | ns\_lc\_insurance  ns\_wv\_InsuranceValue | This domain is the type for the insurance of the traveling exhibition, which will use the temporary locations, so it will be used in the location table. However, it can also be used to show the value of the item, therefore it will also be used in work value table. |
| ns\_exName | varchar(100) | ns\_ex\_exName  ns\_we\_exName  ns\_el\_exName | This domain is the type for the name of the exhibitions that the museum held. Because the exhibition names will act as a part of the primary key in exhibition table, the other tables that associate with the exhibitions information will also use this domain for its attribute. And because the longest exhibition name from the team members can be 100, so, this domain restriction will be 100. |
| ns\_isTraveling | boolean | ns\_ex\_isTraveling | This domain is the special type for the attribute of the exhibition table to tell whether the exhibition is a traveling one or not. It will only be used in the exhibition table. |
| ns\_exStartDate | date | ns\_ex\_exStartDate  ns\_we\_exStartDate  ns\_el\_exStartDate | This domain is the type for the date that the exhibitions will be held. Because the exhibition starting date will act as a part of the primary key in exhibition table, the other tables that associate with the exhibitions information will also use this domain for its attribute. |
| ns\_exDescription | text | ns\_ex\_exDescription | This domain is the type for the exhibition description. It will only be used in the exhibition table. And its type will be a text. |
| ns\_exEndDate | date | ns\_ex\_exEndDate  ns\_we\_exEndDate  ns\_el\_exEndDate | This domain is the type for the date that the exhibitions will end. Though the exhibition end date won’t act as a part of the primary key in exhibition table, the other tables that associate with the exhibitions information will still use this domain for its attribute |
| ns\_travelingStartDate | date | ns\_el\_travelingStartDate | This domain is the type for the travelling exhibition start date. It will only be used in the Exhibitions\_ location table. |
| ns\_travelingEndDate | date | ns\_el\_travelingEndDate | This domain is the type for the travelling exhibition end date. It will only be used in the Exhibitions\_ location table. |
| ns\_trDate | date | ns\_tr\_trDate | This domain is the type for the dates of the transactions that the museum makes. It will only be used in the Transactions table. |
| ns\_trType | varchar(20); | ns\_tr\_trType | This domain is the type for the types of the transactions that the museum makes, including loan, borrow, purchase and sell. It will only be used in the Transactions table. |
| ns\_woStartDate | date | ns\_wo\_woStartDate | This domain is the type for the date that the new owner obtains the item. It will only be used in the Works\_Ownership table. |
| ns\_woEndDate | date | ns\_wo\_woEndDate | This domain is the type for the last date that the previous owner has the item. It will only be used in the Works\_Ownership table. |
| ns\_wlStartDateTime | timestamp | ns\_wl\_wlStartDateTime | This domain is the type for the date that the work move into the location. It will only be used in the Works\_Locations table. Moreover, it is a timestamp type to record exactly the date and time the works move into the locations. |
| ns\_wlEndDateTime | timestamp | ns\_wl\_wlEndDateTime | This domain is the type for the date that the work move out of the location. It will only be used in the Works\_Locations table. Moreover, it is a timestamp type to record exactly the date and time the works move out of the locations. |
| ns\_wvStartDate | date | ns\_wv\_startDate | This domain is the type for the date that the item get the new insurance value. It will only be used in the Works\_Value table. |
| ns\_wvEndDate | date | ns\_wv\_endDate | This domain is the type for the last day that the item has the old insurance value. It will only be used in the Works\_Value table. |
| ns\_state | varchar(30) | ns\_ws\_state | This domain is the type show the state of the work in a period, including: in good condition, stolen, damaged, and restoration. It will only be used in the Works\_State table. |
| ns\_wsStartDate | date | ns\_ws\_wsStartDate | This domain is the type for the date that the item start its current state. It will only be used in the Works\_State table. |
| ns\_wsEndDate | date | ns\_ws\_wsEndDate | This domain is the type for the date that the item end its current state. It will only be used in the Works\_State table. |
| ns\_material | varchar(100) | ns\_wm\_material | This domain is the type for the materials of the works. It will only be used in the Works\_Media table. |

-- (1) **ns\_Institutions table**:

This table will contain all the information of the institutions that the museum associate with, including itself, the team museums and other external museums. The information of the museum will be its name and the contact information.

* ns\_in\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the institutions. And because the attribute is a primary key, it must be NOT NULL.

* ns\_in\_email

The attribute use the domain ns\_email for storing the email of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_phoneNumber

The attribute use the domain ns\_phoneNumber for storing the phone number of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_streetAddress

The attribute use the domain ns\_streetAddress for storing the street address of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_city

The attribute use the domain ns\_city for storing the city address of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_countrySubdivision

The attribute use the domain ns\_ countrySubdivision for storing the state/province of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_country

The attribute use the domain ns\_ country for storing the country of the institutions as theirs contact information. The attribute can be NULL.

* ns\_in\_postalCode

The attribute use the domain ns\_postalCode for storing the postal code of the institutions as theirs contact information. The attribute can be NULL.

* PRIMARY KEY (ns\_in\_InName )

This primary key will only need the name of the institutions, which will be the heart of the database when it exists in all the next tables.

-- (2) **ns\_Works table:**

This table contain all the information of the works that each member’s museum related to. They don’t need to be owned by the museum to go into the system.

* ns\_wk\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wk\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wk\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the team museums that are related to the works (not necessary ownership related). And because the attribute is a primary key, it must be NOT NULL.

* ns\_wk\_wkName

The attribute use the domain ns\_ wkName for storing the name of the works. The attribute can be NULL.

* ns\_wk\_creator

The attribute use the domain ns\_ creator for storing the name of the creator of the works. The attribute can be NULL.

* ns\_wk\_coDate

The attribute use the domain ns\_ coDate for storing the date the works were completed. The attribute can be NULL.

* ns\_wk\_acDate

The attribute use the domain ns\_ acDate for storing the date the works were acquire by the museum. The attribute can be NULL.

* ns\_wk\_wkDescription

The attribute use the domain ns\_ wkDescription for storing the description of the works. The attribute can be NULL.

* ns\_wk\_theme

The attribute use the domain ns\_ theme. The attribute was created as a way to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.

* ns\_wk\_subject

The attribute use the domain ns\_ subject. The attribute was created to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.

* ns\_wk\_culture

The attribute use the domain ns\_ culture. The attribute was created to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.

* ns\_wk\_colour

The attribute use the domain ns\_ colour. The attribute was created to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.

* ns\_wk\_carType
* The attribute use the domain ns\_ carType. The attribute was created to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.
* ns\_wk\_transmission

The attribute use the domain ns\_ tranmission. The attribute was created to combine team members type and subtypes. Therefore, the team members can add their own types/subtypes meaning in the team database. The attribute can be NULL.

* PRIMARY KEY (ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The primary key including the identification of the works and the name of the museum that is related to them. This primary key will also play a big part in the database when it also requires this type of key from other tables that relates to works information.

* FOREIGN KEY ( ns\_wk\_inName)

The works table have connection with the institutions table to pre-check the institutions name.

-- (3) **ns\_Locations table:**

This table contain all the information of the locations and temporary locations that the team museums have.

* ns\_lc\_lcName [PK]

The attribute use the domain ns\_lcName for storing the name of the location in each museum. And because the attribute is a primary key, it must be NOT NULL.

* ns\_lc\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the team museums that own the locations. And because the attribute is a primary key, it must be NOT NULL.

* ns\_lc\_length

The attribute use the domain ns\_ lenght for storing the length of the locations. The attribute can be NULL.

* ns\_lc\_height

The attribute use the domain ns\_ height for storing the height of the locations. The attribute can be NULL.

* ns\_lc\_width

The attribute use the domain ns\_ width for storing the width of the locations. The attribute can be NULL.

* ns\_lc\_minNumWorks

The attribute use the domain ns\_ minNumWorks for storing the minimum capacity of the locations. The attribute can be NULL.

* ns\_lc\_maxNumWorks

The attribute use the domain ns\_ maxNumWorks for storing the maximum capacity of the locations. The attribute can be NULL.

* ns\_lc\_availabilityDate

The attribute use the domain ns\_availabilityDate for storing the date that the locations are available. The attribute can be NULL.

* ns\_lc\_sponsor

The attribute use the domain ns\_sponsor for storing the sponsor of the travelling exhibition, which will be held in a temporary location. The attribute can be NULL.

* ns\_lc\_security

The attribute use the domain ns\_security for storing the head of the security of the travelling exhibition, which will be held in a temporary location. The attribute can be NULL.

* ns\_lc\_insurance
* The attribute use the domain ns\_insurance for storing the insurance value of all the works in each location in the travelling exhibition, which will be held in a temporary location. The attribute can be NULL.
* ns\_lc\_StreetAddress

The attribute use the domain ns\_streetAddress for storing the address of the temporary location. The attribute can be NULL.

* ns\_lc\_city

The attribute use the domain ns\_city for storing the city of the temporary location. The attribute can be NULL.

* ns\_lc\_countrySubdivision

The attribute use the domain ns\_countrySubdivision for storing the state/province of the temporary location. The attribute can be NULL.

* ns\_lc\_country

The attribute use the domain ns\_country for storing the country of the temporary location. The attribute can be NULL.

* ns\_lc\_postalCode

The attribute use the domain ns\_ postalCode for storing the postal code of the temporary location. The attribute can be NULL.

* PRIMARY KEY (ns\_lc\_lcName, ns\_lc\_inName)

The primary key including the location name and the name of the museum owning it. As the primary key of one of the main tables, this primary key will also set up the primary in the other tables that relate to the locations information.

* FOREIGN KEY (ns\_lc\_inName) REFERENCES ns\_institutions( ns\_in\_inName)

The locations table have connection with the institutions table to pre-check the institutions name.

-- (4) **ns\_Exhibitions TABLE:**

This table contain all the information of the exhibitions and travelling exhibitions that the team museums have

* ns\_ex\_exName [PK]

The attribute use the domain ns\_exName for storing the name of the exhibitions hold by each museum. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ex\_exStartDate [PK]

The attribute use the domain ns\_exStartDate for storing the date that the exhibitions start. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ex\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums held the exhibitions. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ex\_isTraveling

The attribute use the domain ns\_isTraveling for storing the information whether or not the exhibitions is a travelling one. Though the attribute is not part of the primary key, it must be NOT NULL, for it is used to categorize 2 types of exhibition.

* ns\_ex\_exDescription

The attribute use the domain ns\_ exDescription for storing the description of the exhibitions. The attribute can be NULL.

* ns\_ex\_exEndDate

The attribute use the domain ns\_exEndtDate for storing the date that the exhibitions end. The attribute can be NULL and can be updated later.

* PRIMARY KEY (ns\_ex\_exName, ns\_ex\_exStartDate, ns\_ex\_inName )

The primary key has the exhibition name and institution as the one in the location, however, it also includes the start date because there may be other exhibitions with the same name at different timeline. This primary key will also define other primary key and foreign key of the other tables that relate to exhibitions information.

* FOREIGN KEY ( ns\_ex\_inName ) REFERENCES ns\_institutions(ns\_in\_inName )

The exhibitions table have connection with the institutions table to pre-check the institutions name.

-- (5) **ns\_Transactions TABLE:**

This table contain all the transaction that the member museum has made and the time they perform it. The change in this table can also affect the ownership table.

* ns\_tr\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that is related to this transaction. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_inNameReceiver [PK]

The attribute use the domain ns\_inName for storing the name of the institutions that are the borrower or the buyer in this transaction. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_inNameGiver [PK]

The attribute use the domain ns\_inName for storing the name of the institutions that are the lender or the seller in this transaction. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item in the transaction. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item in the transaction. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_trDate [PK]

The attribute use the domain ns\_trDate for storing the date that the transaction is made. And because the attribute is a primary key, it must be NOT NULL.

* ns\_tr\_trType

The attribute use the domain ns\_ trType for storing the type of the transaction, such as: buy, sell, borrow in, borrow out, lend in, lend out. The attribute can be NULL, though it should not, for it is one part of the table identification.

* ns\_tr\_IDAlphaOther

The attribute use the domain ns\_IDNumeric for storing the part of the old identification key of the item in the transaction. This attribute will only be used when there is a transaction between the museum of the team members, and we need to store the item old identification for later recognition. The attribute can be NULL.

* ns\_tr\_ns\_IDNumericOther

The attribute use the domain ns\_IDAlpha for storing the part of the old identification key of the item in the transaction. This attribute will only be used when there is a transaction between the museum of the team members, and we need to store the item old identification for later recognition. The attribute can be NULL.

* PRIMARY KEY (ns\_tr\_inName, ns\_tr\_inNameReceiver, ns\_tr\_inNameGiver, ns\_tr\_IDAlpha, ns\_tr\_IDNumeric, ns\_tr\_trDate)

The primary key will be defined mostly by the works table and institution table for its connection with those 2 tables. We also use the transaction date as part of the transaction to avoid duplicate data.

* FOREIGN KEY (ns\_tr\_inName, ns\_tr\_IDAlpha , ns\_tr\_IDNumeric ) REFERENCES ns\_works(ns\_wk\_inName, ns\_wk\_IDAlpha, ns\_wk\_IDNumeric )

The table have connection with the works table to pre-check the items information.

* FOREIGN KEY (ns\_tr\_inNameReceiver) REFERENCES ns\_institutions(ns\_in\_inName)

The table have connection with the institutions table to pre-check the institutions name for the receiver.

* FOREIGN KEY (ns\_tr\_inNameGiver) REFERENCES ns\_institutions(ns\_in\_inName)

The table have connection with the institutions table to pre-check the institutions name for the giver.

-- (6) **ns\_Works-Ownership TABLE:**

This table show the old and current ownership of each works in the system, which is done by the effect from the transaction table.

* ns\_wo\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that is related to the works (not necessary the owner). And because the attribute is a primary key, it must be NOT NULL.

* ns\_wo\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wo\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wo\_inNameOwner [PK]

The attribute use the domain ns\_inName for storing the name of the owners of the works. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wo\_woStartDate [PK]

The attribute use the domain ns\_woStartDate for storing the date that the ownership start. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wo\_woEndDate

The attribute use the domain ns\_woEndDate for storing the date that the ownership end. The attribute can be NULL.

* PRIMARY KEY (ns\_wo\_inName, ns\_wo\_IDAlpha, ns\_wo\_IDNumeric, ns\_wo\_woStartDate,ns\_wo\_inNameOwner )

The primary key will be defined mostly by the works table and institution table for its connection with those 2 tables. We also use the transaction date as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_wo\_IDAlpha, ns\_wo\_IDNumeric, ns\_wo\_inName) REFERENCES ns\_Works(ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The table have connection with the works table to pre-check the items information.

* FOREIGN KEY (ns\_wo\_inNameOwner ) REFERENCES ns\_Institutions(ns\_in\_inName)

The table have connection with the institutions table to pre-check the institutions name for the receiver.

-- (7) **ns\_Works-Locations TABLE:**

This table shows the history of works transferring between location inside a museum or between the member museums or even when it is on loan.

* ns\_wl\_lcName [PK]

The attribute use the domain ns\_lcName for storing the name of the location in each museum that are or used to store the works. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wl\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wl\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wl\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that is related to the works and contain the locations. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wl\_wlStartDateTime [PK]

The attribute use the domain ns\_wlStartDateTime for storing the date and time that the works go into the location. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wl\_wlEndDateTime

The attribute use the domain ns\_wlEndDateTime for storing the date and time that the works go into the location. The attribute can be NULL.

* PRIMARY KEY (ns\_wl\_lcName,ns\_wl\_IDAlpha, ns\_wl\_IDNumeric, ns\_wl\_inName, ns\_wl\_wlStartDateTime)

The primary key will be defined mostly by the works table and locations table for its connection with those 2 tables. We also use the start date time as part of the PK to avoid duplicate data.

* FOREIGN KEY ( ns\_wl\_inName ,ns\_wl\_IDAlpha, ns\_wl\_IDNumeric) REFERENCES ns\_works(ns\_wk\_inName, ns\_wk\_IDAlpha, ns\_wk\_IDNumeric )

The table have connection with the works table to pre-check the items information.

* FOREIGN KEY (ns\_wl\_lcName, ns\_wl\_inName) REFERENCES ns\_locations(ns\_lc\_lcName, ns\_lc\_inName )

The table have connection with the locations table to pre-check the institutions and locations name.

-- (8) **ns\_Works-Exhibitions:**

This table shows the history of works that have been used in the exhibition, based on the period the exhibition is held and end.

* ns\_we\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_we\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_we\_exName [PK]

The attribute use the domain ns\_exName for storing the name of the exhibitions that used to or will use the items. And because the attribute is a primary key, it must be NOT NULL.

* ns\_we\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that is related to the works and will held the exhibitions. And because the attribute is a primary key, it must be NOT NULL.

* ns\_we\_exStartDate [PK]

The attribute use the domain ns\_exStartDate for storing the date that the exhibitions start. And because the attribute is a primary key, it must be NOT NULL.

* ns\_we\_exEndDate

The attribute use the domain ns\_exEndDate for storing the date that the exhibitions end. The attribute can be NULL and can be updated later.

* PRIMARY KEY (ns\_we\_IDAlpha, ns\_we\_IDNumeric, ns\_we\_exName, ns\_we\_inName, ns\_we\_exStartDate)

The primary key will be defined mostly by the works table and exhibitions table for its connection with those 2 tables. We also use the start date time as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_we\_IDAlpha, ns\_we\_IDNumeric, ns\_we\_inName) REFERENCES ns\_works(ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The table have connection with the works table to pre-check the items information.

* FOREIGN KEY (ns\_we\_exName, ns\_we\_inName , ns\_we\_exStartDate ) REFERENCES ns\_exhibitions(ns\_ex\_exName, ns\_ex\_inName, ns\_ex\_exStartDate)

The table have connection with the exhibitions table to pre-check the exhibitions information.

-- (9) **ns\_Exhibitions-Locations TABLE:**

This table shows the history of where all the exhibitions have been held. The travelling exhibitions can be one of the special case when we must use multiple locations to represent one exhibition.

* ns\_el\_lcName [PK]

The attribute use the domain ns\_lcName for storing the name of the location that is used for the exhibitions. And because the attribute is a primary key, it must be NOT NULL.

* ns\_el\_exName [PK]

The attribute use the domain ns\_exName for storing the name of the exhibitions that are held in the locations. And because the attribute is a primary key, it must be NOT NULL.

* ns\_el\_exStartDate [PK]

The attribute use the domain ns\_exStartDate for storing the date that the exhibitions start. And because the attribute is a primary key, it must be NOT NULL.

* ns\_el\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that own the location and will held the exhibitions. And because the attribute is a primary key, it must be NOT NULL.

* ns\_el\_travelingStartDate

The attribute use the domain ns\_travelingStartDate for storing the date that the travelling exhibition end in each temporary location. The attribute can be NULL and can be updated later.

* ns\_el\_travelingEndDate

The attribute use the domain ns\_travelingEndDate for storing the date that the travelling exhibition end in each temporary location. The attribute can be NULL and can be updated later.

* ns\_el\_exEndDate

The attribute use the domain ns\_exEndDate for storing the date that the exhibitions end. The attribute can be NULL and can be updated later.

* PRIMARY KEY (ns\_el\_lcName, ns\_el\_exName, ns\_el\_exStartDate, ns\_el\_inName),

The primary key will be defined mostly by the locations table and exhibitions table for its connection with those 2 tables. We also use the start date time as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_el\_lcName, ns\_el\_inName) REFERENCES ns\_locations(ns\_lc\_lcName, ns\_lc\_inName)

The table have connection with the locations table to pre-check the institutions and locations name.

* FOREIGN KEY (ns\_el\_exName, ns\_el\_exStartDate, ns\_el\_inName) REFERENCES ns\_exhibitions(ns\_ex\_exName, ns\_ex\_exStartDate, ns\_ex\_inName)

The table have connection with the exhibitions table to pre-check the exhibitions information.

-- (10) **ns\_Works\_Value TABLE:**

This table shows the history of works value have been changed in the time it is belong to a team museum. When the item is no longer belong to the museum, we only need to update its end date and never care about its new value anymore.

* ns\_wv\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wv\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wv\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums that currently have the works when its value changed. So, when they don’t own the work anymore, they don’t need to update its new value. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wv\_InsuranceValue [PK]

The attribute use the domain ns\_insurance for storing the old and new value of the work when it is owned by a team museum, however, there won’t need any update when the its locations is changed, even between the team museum. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wv\_startDate

The attribute use the domain ns\_wvStartDate for storing the date that the new value is set. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wv\_enddate

The attribute use the domain ns\_exEndDate for storing the date that the old value is no more. The attribute can be NULL and can be updated later.

* PRIMARY KEY (ns\_wv\_IDAlpha, ns\_wv\_IDNumeric, ns\_wv\_inName, ns\_wv\_InsuranceValue)

The primary key will be defined mostly by the works table. We also use the start date time as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_wv\_IDAlpha, ns\_wv\_IDNumeric, ns\_wv\_inName) REFERENCES ns\_works(ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The table have connection with the works table to pre-check the items information.

-- (11) **ns\_Works\_State TABLE:**

This table shows the history of works state have been changed in the time it is belong to a team museum. When the item is no longer belong to the museum, we only need to update its end date and never care about its new state anymore.

* ns\_ws\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ws\_IDNumeric[PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ws\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that own the works when it current state changed. And because the attribute is a primary key, it must be NOT NULL.

ns\_inName NOT NULL,

* ns\_ws\_wsStartDate [PK]
* The attribute use the domain ns\_wsStartDate for storing the date that the new state is set. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ws\_state

The attribute use the domain ns\_state for storing the old and new state of the work when it is owned by a team museum, however, there won’t need any update when the its locations is changed, even between the team museum. The attribute can be NULL and can be updated later

* ns\_ws\_wsEndDate

The attribute use the domain ns\_exEndDate for storing the date that the old state is over. The attribute can be NULL and can be updated later

* PRIMARY KEY (ns\_ws\_IDAlpha, ns\_ws\_IDNumeric, ns\_ws\_inName, ns\_ws\_wsStartDate)

The primary key will be defined mostly by the works table. We also use the start date time as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_ws\_IDAlpha, ns\_ws\_IDNumeric, ns\_ws\_inName) REFERENCES ns\_works(ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The table have connection with the works table to pre-check the items information.

-- (12) **ns\_Works\_Media TABLE:**

This table contain the material that made up the works.

* ns\_wm\_IDAlpha [PK]

The attribute use the domain ns\_IDAlpha for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wm\_IDNumeric [PK]

The attribute use the domain ns\_IDNumeric for storing the part of the identification key of the item. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wm\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums of the team that is related to the works. And because the attribute is a primary key, it must be NOT NULL.

* ns\_wm\_material [PK]
* The attribute use the domain ns\_material for storing the material that made the works. And because the attribute is a primary key, it must be NOT NULL.

ns\_material NOT NULL,

* PRIMARY KEY (ns\_wm\_IDAlpha, ns\_wm\_IDNumeric, ns\_wm\_inName, ns\_wm\_material)

The primary key will be defined mostly by the works table. We also use the material as part of the PK to avoid duplicate data.

* FOREIGN KEY (ns\_wm\_IDAlpha, ns\_wm\_IDNumeric , ns\_wm\_inName) REFERENCES ns\_works(ns\_wk\_IDAlpha, ns\_wk\_IDNumeric, ns\_wk\_inName)

The table have connection with the works table to pre-check the items information.

-- (13) **ns\_Locations\_Doors TABLE:**

This table contain the information of the door that connect the rooms in each team member locations.

* ns\_ld\_inName [PK]

The attribute use the domain ns\_inName for storing the name of the museums that own the locations. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ld\_lcName1 [PK]

The attribute use the domain ns\_lcName for storing the name of the location that have the have the door connect to the other rooms. And because the attribute is a primary key, it must be NOT NULL.

* ns\_ld\_lcName2 [PK]

The attribute use the domain ns\_lcName for storing the name of the location that have the have the door connect to the other rooms. And because the attribute is a primary key, it must be NOT NULL.

* PRIMARY KEY (ns\_ld\_inName, ns\_ld\_lcName1, ns\_ld\_lcName2)

The primary key will be defined mostly by the locations table. The 2 rooms connect by the door will also be a part of the PK

* FOREIGN KEY (ns\_ld\_lcName1, ns\_ld\_inName) REFERENCES ns\_locations(ns\_lc\_lcName, ns\_lc\_inName)

The table have connection with the locations table to pre-check the institutions and locations name.

* FOREIGN KEY (ns\_ld\_lcName2, ns\_ld\_inName) REFERENCES ns\_locations(ns\_lc\_lcName, ns\_lc\_inName)

The table have connection with the locations table to pre-check the institutions and locations name.