

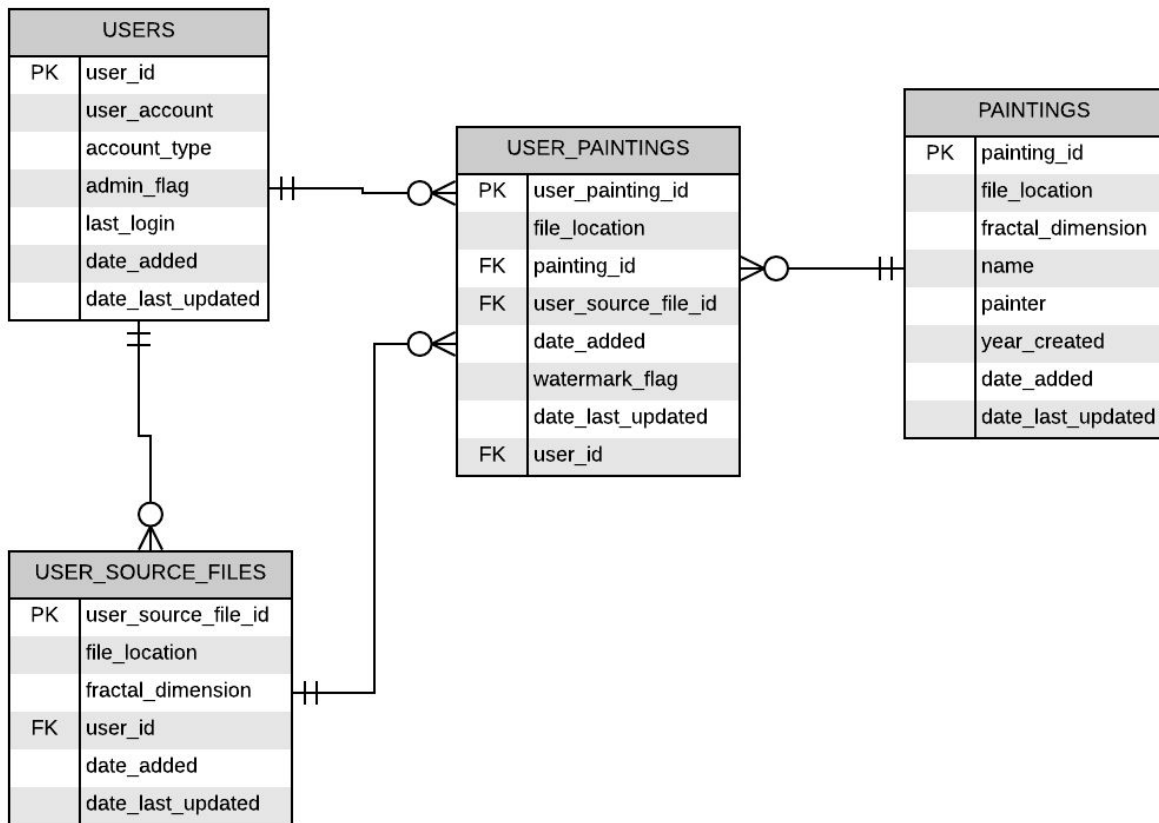
# Fractal Factory



## ER Diagram Documentation

Kenny Mejia, Candice Rivera, Jada Tijani, Brandon Kline, and Eric Stenton  
Professor Rivas  
CMPT\_475N\_200  
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## ER Diagram:



Columns with \*\* will be finalized at a later date

## **Tables:**

1. **USERS** - This table holds user account information.
  - a. **user\_id** - The *primary key* for the table; it is a guaranteed unique identifier for every user that signs up and receives an account on the site.
    - Data type: *varchar(40)* or supported *uuid* data type
  - b. **user\_account\*\*** - The user's email or other identifier that they used during the signup process.
    - Data type: *varchar(255)*
  - c. **account\_type** - Whether the user signed up with Marist, Facebook, or Google account credentials.
    - Data type: *varchar(40)*
  - d. **admin\_flag** - Flag that determines if the user has administrative privileges.
    - Data type: *char(1)* (e.g. t,f) or supported *bool* data type
  - e. **last\_login** - Records the user's last login date and time.
    - Data type: *datetime*
  - f. **date\_added** - The date and time the user is added to the system.
    - Data type: *datetime*
  - g. **date\_last\_updated** - The date and time the user's account information is last updated.
    - Data type: *datetime*

2. **USER\_SOURCE\_FILES** - This table holds information relating to the code source files uploaded by the user.

- a. **user\_source\_file\_id** - The *primary key* for the table; it is unique for every source file uploaded.
  - Data type: *varchar(40)* or supported *uuid* data type
- b. **user\_id** - A *foreign key*; it relates the user\_source\_files table to the users\_table (e.g. every piece of code uploaded will belong to one and only one user).
  - Data type: *varchar(40)* or supported *uuid* data type
- c. **file\_location** - Link to the source file that is stored in a separate location.
  - Data type: *varchar(250)*
- d. **fractal\_dimension** - The calculated fractal dimension of the source file.
  - Data type: *double(5)*
- e. **date\_added** - The date and time the source file is uploaded.
  - Data type: *datetime*
- f. **date\_last\_updated** - The date and time the source file information is last updated.
  - Data type: *datetime*

3. **PAINTINGS** - This table holds information about the paintings imported from the Metropolitan Museum of Art's database.

a. **painting\_id** - The *primary key* for the table; it is unique for every painting.

➤ Data type: *varchar(40)* or supported *uuid* data type

b. **file\_location** - The link to the painting that is stored in a separate location.

➤ Data type: *varchar(250)*

c. **fractal\_dimension** - The calculated fractal dimension of the painting.

➤ Data type: *double(5)*

d. **name** - The name of the painting.

➤ Data type: *varchar(150)*

e. **painter** - The name of the painter.

➤ Data type: *varchar(100)*

f. **year\_created** - The year that the painting was created.

➤ Data type: *year*

g. **date\_added** - The date and time that the painting is added to the database.

➤ Data type: *datetime*

h. **date\_last\_updated** - The date and time that the painting information is last updated.

➤ Data type: *datetime*

4. **USER\_PAINTINGS** - This table holds information on the paintings that are created from the user's source file and selected painting.

a. **user\_painting\_id** - The *primary key* for the table; it is unique for every painting created by the user's source code.

➤ Data type: *varchar(40)* or supported *uuid* data type

b. **painting\_id** - A *foreign key*; it relates the user\_paintings table to the paintings table (e.g. every user painting created will have come about from one and only one painting).

➤ Data type: *varchar(40)* or supported *uuid* data type

c. **user\_source\_file\_id** - A *foreign key*; it relates the user\_painting table to the user\_source\_file table (e.g. every user painting will be created from one and only one user source file).

➤ Data type: *varchar(40)* or supported *uuid* data type

d. **user\_id** - A *foreign key*; it relates the user\_source\_files table to the users\_table (e.g. every piece of code uploaded will belong to one and only one user).

➤ Data type: *varchar(40)* or supported *uuid* data type

e. **file\_location** - The link to the user painting that is stored in a separate location.

➤ Data type: *varchar(250)*

f. **watermark\_flag** - Flag that determines whether the painting should be displayed with or without a watermark.

➤ Data type: *char(1)* (e.g. t,f) or supported *bool* data type

g. **date\_added** - The date and time that the user painting is added to the database.

➤ Data type: *datetime*

h. **date\_last\_updated** - The date and time that the user painting is last updated.

➤ Data type: *datetime*

## **3NF Proof:**

- Below are the four tables. Each contains five rows of example data:

USERS:

user_id	user_account	account_type	admin_flag	last_login	date_added	date_last_updated
072ba068-3256-46e7-9138-5f454b92b81e	example@gmail.com	Google	F	2002-02-27 21:14:05	2009-12-22 10:34:32	2014-08-17 19:15:53
a67d93f5-d24c-458e-b090-ad03e10936e	kjl7w	Marist	T	2014-03-22 17:24:48	2017-11-11 07:57:24	2017-11-11 07:57:24
1374801c-b520-4a55-aecc-b841930a05d4	fc@yahoo.com	Facebook	F	2006-05-20 17:03:43	2008-02-22 18:08:15	2009-12-22 10:34:32
7ea674d9-eb9d-4ce4-9da9-0d0c50bfe55f	kjl8w	Marist	T	2003-03-12 02:55:17	2009-12-22 10:34:32	2011-09-04 03:53:05
35eeb5a1-670a-46a6-ad9c-567d23fd339b	gg@gmail.com	Google	F	2008-08-05 22:22:49	2017-11-11 07:57:24	2017-11-11 07:57:24

USER\_SOURCE\_FILES:

user_source_file_id	file_location	fractal_dimension	user_id	date_added	date_last_updated
5eac02f8-1aa5-4646-944d-6dd46827659c	/srv/source_files/usf0	1.67	072ba068-3256-46e7-9138-5f454b92b81e	2004-09-13 11:27:50	2014-08-17 19:15:53
f02e5204-ecad-41c4-a344-37d8fadca447	/srv/source_files/usf1	1.91	a67d93f5-d24c-458e-b090-ada03e10936e	2008-02-22 18:08:15	2013-04-10 05:13:14
dff03454-d205-4d57-8074-55b9019e7e02	/srv/source_files/usf2	1.34	1374801c-b520-4a55-aecc-b841930a05d4	2017-11-11 07:57:24	2017-11-11 07:57:24
86a2d9cd-9f5e-4ffe-b0cf-c64a0c9ab7ae	/srv/source_files/usf3	1.56	7ea674d9-eb9d-4ce4-9da9-0d0c50bfe55f	2009-12-22 10:34:32	2011-09-04 03:53:05
753cb0d6-240a-49e6-a07b-13430a902743	/srv/source_files/usf4	1.89	35eeb5a1-670a-46a6-ad9c-567d23fd339b	2002-01-29 09:46:49	2005-01-29 04:45:45

## USER\_PAINTINGS:

user_painting_id	file_location	painting_id	user_source_file_id	user_id	date_added	watermark_flag	date_last_updated
cd7870b2-2d4d-4ff9-9801-05c6fa7c44a8	/srv/user_paintings/up0	afbbadc3-d088-46b6-bbef-66494a659e7f	5eac02f8-1aa5-4646-944d-6dd46827659c	072ba068-3256-46e7-9138-5f454b92b81e	2016-11-08 07:46:42	T	2017-11-11 07:57:24
55ce7670-ccd5-4fc7-9b88-6cdc0743d9ee	/srv/user_paintings/up1	8eea83d0-5ff8-42bf-8b19-aa584b904a3d	f02e5204-ecad-41c4-a344-37d8fadca447	a67d93f5-d24c-458e-b090-ada03e10936e	2014-08-17 19:15:53	T	2017-11-11 07:57:24
b93fc5cc-32aa-459e-9008-2e9b513df827	/srv/user_paintings/up2	2aecd4b7-f48a-4692-b972-890f20038031	df03454-d205-4d57-8074-55b9019e7e02	1374801c-b520-4a55-aecb-b841930a05d4	2011-09-04 03:53:05	F	2011-09-04 03:53:05
6019efa8-1657-42af-bdba-f7075a0d99b6	/srv/user_paintings/up3	f57633b0-969c-44b7-b859-6dad96ceae0	86a2d9cd-9f5e-4ffe-b0cf-c64a0c9ab7ae	7ea674d9-eb9d-4ce4-9da9-0d0c50bfe55f	2013-04-10 05:13:14	F	2013-04-10 05:13:14
f3bdb8d5-7b8a-47ed-9ef3-ee375a928abe	/srv/user_paintings/up4	2ad8d839-9c7f-4682-8740-64b6413b3254	753cb0d6-240a-49e6-a07b-13430a902743	35eeb5a1-670a-46a6-ad9c-567d23fd339b	2005-01-29 04:45:45	T	2008-08-05 22:22:49

## PAINTINGS:

painting_id	file_location	fractal_dimension	name	painter	year_created	date_added	date_last_updated
afbbadc3-d088-46b6-bbef-66494a659e7f	/srv/paintings/p0	1.26	Mona Lisa	Leonard Da Vinci	1557	2003-11-21 05:37:50	2005-01-29 04:45:45
8eea83d0-5ff8-42bf-8b19-aa584b904a3d	/srv/paintings/p1	1.22	The Starry Night	Vincent Van Gogh	1889	2008-12-13 20:06:52	2016-11-08 07:46:42
2aecd4b7-f48a-4692-b972-890f20038031	/srv/paintings/p2	1.67	The Scream	Edvard Munch	1893	2002-10-22 12:40:50	2008-12-13 20:06:52
f57633b0-969c-44b7-b859-6dad96ceae0	/srv/paintings/p3	1.43	The Night Watch	Rembrandt	1642	2011-06-20 13:22:52	2011-09-04 03:53:05
2ad8d839-9c7f-4682-8740-64b6413b3254	/srv/paintings/p4	1.87	The Creation of Adam	Michelangelo	1512	2012-11-29 19:01:43	2017-11-11 07:57:24

- Each column contains only atomic values.
- There are no repeating groups.
- Each non-key column is dependent on the table's primary key.



- Each column is non-transitively dependent on the table's primary key.
- Left joining the user\_paintings and user\_source\_files tables to the users table, then left joining the paintings table to the user\_paintings table provides a complete table with referential integrity. Each user has one user painting and one user source file which makes use of each of the paintings, so no nulls are present. However, it is possible that a user may not have uploaded a source file or requested a painting which will result in nulls for those columns. Furthermore, not all paintings may be used to make user paintings, so nulls may result from that circumstance. Such nulls are expected and follow our business rules. Due to the length of the resulting table, it is shown below in six segments:



Abc PAINTINGS painting id (PAINT...	Abc PAINTINGS file location (PAIN...	# PAINTINGS fractal dimension ...	Abc PAINTINGS Name	Abc PAINTINGS Painter
afbbadc3-d088-46b6-...	/srv/paintings/p0	1.260000	Mona Lisa	Leonard Da Vinci
8eea83d0-5ff8-42bf-...	/srv/paintings/p1	1.220000	The Starry Night	Vincent Van Gogh
2aec4b7-f48a-4692-...	/srv/paintings/p2	1.670000	The Scream	Edvard Munch
f57633b0-969c-44b7-...	/srv/paintings/p3	1.430000	The Night Watch	Rembrandt
2ad8d839-9c7f-4682-...	/srv/paintings/p4	1.870000	The Creation of Adam	Michelangelo

# PAINTINGS Year Created	Abc PAINTINGS date added (PAIN...	Abc PAINTINGS date last updated ...	Abc USER/PAINTINGS User Painting Id	Abc USER/PAINTINGS File Location
1557	2003-11-21 05:37:50	2005-01-29 04:45:45	cd7870b2-2d4d-4ff9-...	/srv/user_paintings/u...
1889	2008-12-13 20:06:52	2016-11-08 07:46:42	55ce7670-ccd5-4fc7-...	/srv/user_paintings/u...
1893	2002-10-22 12:40:50	2008-12-13 20:06:52	b93fc5cc-32aa-459e-...	/srv/user_paintings/u...
1642	2011-06-20 13:22:52	2011-09-04 03:53:05	6019efa8-1657-42af-...	/srv/user_paintings/u...
1512	2012-11-29 19:01:43	2017-11-11 07:57:24	f3bdb8d5-7b8a-47ed-...	/srv/user_paintings/u...

Abc USER!PAINTINGS Painting Id	Abc USER!PAINTINGS User Source File Id	Abc USER!PAINTINGS user id (USER!PAI...	Abc USER!PAINTINGS date added (USER...	Abc USER!PAINTINGS Watermark Flag
afbbadc3-d088-46b6-...	5eac02f8-1aa5-4646-...	072ba068-3256-46e7...	2016-11-08 07:46:42	T
8eea83d0-5ff8-42bf-...	f02e5204-ecad-41c4-...	a67d93f5-d24c-458e-...	2014-08-17 19:15:53	T
2aec4b7-f48a-4692-...	dff03454-d205-4d57-...	1374801c-b520-4a55...	2011-09-04 03:53:05	F
f57633b0-969c-44b7-...	86a2d9cd-9f5e-4ffe-b...	7ea674d9-eb9d-4ce4-...	2013-04-10 05:13:14	F
2ad8d839-9c7f-4682-...	753cb0d6-240a-49e6-...	35eeb5a1-670a-46a6-...	2005-01-29 04:45:45	T

Abc USER!PAINTINGS date last updated ...	Abc USER!SOURCE!FILES user source file id ...	Abc USER!SOURCE!FILES file location (USE...	# USER!SOURCE!FILES Fractal Dimension	Abc USER!SOURCE!FILES user id (USER!SO...
2017-11-11 07:57:24	5eac02f8-1aa5-4646-...	/srv/source_files/usf0	1.670000	072ba068-3256-46e7...
2017-11-11 07:57:24	f02e5204-ecad-41c4-...	/srv/source_files/usf1	1.910000	a67d93f5-d24c-458e-...
2011-09-04 03:53:05	dff03454-d205-4d57-...	/srv/source_files/usf2	1.340000	1374801c-b520-4a55...
2013-04-10 05:13:14	86a2d9cd-9f5e-4ffe-b...	/srv/source_files/usf3	1.560000	7ea674d9-eb9d-4ce4-...
2008-08-05 22:22:49	753cb0d6-240a-49e6-...	/srv/source_files/usf4	1.890000	35eeb5a1-670a-46a6-...

Abc USER!SOURCE!FILES date added (USER...	Abc USER!SOURCE!FILES date last updated ...	Abc USERS User Id	Abc USERS User Account	Abc USERS Account Type
2004-09-13 11:27:50	2014-08-17 19:15:53	072ba068-3256-46e7...	example@gmail.com	Google
2008-02-22 18:08:15	2013-04-10 05:13:14	a67d93f5-d24c-458e-...	kjl7w	Marist
2017-11-11 07:57:24	2017-11-11 07:57:24	1374801c-b520-4a55...	fc@yahoo.com	Facebook
2009-12-22 10:34:32	2011-09-04 03:53:05	7ea674d9-eb9d-4ce4-...	kjl8w	Marist
2002-01-29 09:46:49	2005-01-29 04:45:45	35eeb5a1-670a-46a6-...	gg@gmail.com	Google

Abc USERS Admin Flag	Abc USERS Last Login	Abc USERS Date Added	Abc USERS Date Last Updated
F	2002-02-27 21:14:05	2009-12-22 10:34:32	2014-08-17 19:15:53
T	2014-03-22 17:24:48	2017-11-11 07:57:24	2017-11-11 07:57:24
F	2006-05-20 17:03:43	2008-02-22 18:08:15	2009-12-22 10:34:32
T	2003-03-12 02:55:17	2009-12-22 10:34:32	2011-09-04 03:53:05
F	2008-08-05 22:22:49	2017-11-11 07:57:24	2017-11-11 07:57:24