



**What do you like to do  
in your Free time?**

# What do you like to do in your Free time?

Exercising, reading, meeting friends, listening to music,  
watching movies, cooking, studying, sleeping, going on  
trips, visiting restaurants, and **playing games**



# Video Games Sales in SQL



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Professor Venkata Duvvuri



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START

# Table Of Contents

1



## Data & Business Questions

Data Cleaning in Excel,  
Rationale of Data and  
Business Questions

2

## ERD & Data Upload & Cleaning

Entity Relationship Diagram,  
Data Upload in MySQL, bit of a  
data cleaning

3

## Assign 'id', PK and FK in MySQL Answering Q by Queries

Making PK & FK relationship in MySQL  
Answering business questions by  
MySQL queries



The background is a dark purple color with several large, abstract, organic shapes in light blue and pink. Scattered throughout are various icons: a yellow lightning bolt, a yellow joystick with a purple ball top, a yellow headset with a microphone, and several small yellow and pink circles.

# 1. Data & Business Questions

Rationale of Data and  
Business Questions



# Game Sales Dataset

First look of game dataset, **16,720** entries and **15** columns

Here, we consider facts and dimensions to convert and manage data into normal form.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	Platform	Year_	Genre	Publisher	NA_Sales	EU_JP_	Other_	Global_	Critic_Scor	Critic_Cou	User_Score	User_Cour	Developer	Rating	
2	Wii Sports	Wii	2006	Sports	Nintendo	41.36	29	4	8.45	82.53	76	51	8	322	Nintendo	E
3	Super Mario	NES	1985	Platform	Nintendo	29.08	4	7	0.77	40.24	NULL	NULL	NULL	NULL	NULL	NULL
4	Mario Kart W	Wii	2008	Racing	Nintendo	15.68	13	4	3.29	35.52	82	73	8.3	709	Nintendo	E
5	Wii Sports Re	Wii	2009	Sports	Nintendo	15.61	11	3	2.95	32.77	80	73	8	192	Nintendo	E
6	Pokemon Red	GB	1996	Role-Playin	Nintendo	11.27	9	10	1	31.37	NULL	NULL	NULL	NULL	NULL	NULL
7	Tetris	GB	1989	Puzzle	Nintendo	23.2	2	4	0.58	30.26	NULL	NULL	NULL	NULL	NULL	NULL
8	New Super M	DS	2006	Platform	Nintendo	11.28	9	7	2.88	29.8	89	65	8.5	431	Nintendo	E
9	Wii Play	Wii	2006	Misc	Nintendo	13.96	9	3	2.84	28.92	58	41	6.6	129	Nintendo	E
10	New Super M	Wii	2009	Platform	Nintendo	14.44	7	5	2.24	28.32	87	80	8.4	594	Nintendo	E
11	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	1	0	0.47	28.31	NULL	NULL	NULL	NULL	NULL	NULL
12	Nintendogs	DS	2005	Simulation	Nintendo	9.05	11	2	2.74	24.67	NULL	NULL	NULL	NULL	NULL	NULL
13	Mario Kart D	DS	2005	Racing	Nintendo	9.71	7	4	1.9	23.21	91	64	8.6	464	Nintendo	E



# Game Sales Dataset

the important information

Game info

Sales

critic & user score Developer

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	Platform	Year_	Genre	Publisher	NA_Sales	EU_JP_	Other_	Global_	Critic_Scor	Critic_Cou	User_Score	User_Cour	Developer	Rating	
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5	Wii Sports Re	Wii	2009	Sports	Nintendo	15.61	11	3	2.95	32.77	80	73	8	192	Nintendo	E
6	Pokemon Red	GB	1996	Role-Playin	Nintendo	11.27	9	10	1	31.37	NULL	NULL	NULL	NULL	NULL	NULL
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12	Nintendogs	DS	2005	Simulation	Nintendo	9.05	11	2	2.74	24.67	NULL	NULL	NULL	NULL	NULL	NULL
13	Mario Kart D	DS	2005	Racing	Nintendo	9.71	7	4	1.9	23.21	91	64	8.6	464	Nintendo	E



# Business Questions

## ★ Question One

Which gaming platform has the largest number of games available?

## ★ Question Two

Which gaming platform has the highest total sales?

## ★ Question Three

What are the average sales figures for each gaming platform?

## ★ Question Four

Which game genre has the highest total sales average?

## ★ Question Five

Comparison of the top 10 games by critic score and the top 10 games by user score, along with their sales figures.







# 2. ERD, Data Cleaning & Data Upload

Entity Relationship Diagram (ERD),  
Bit of a data cleaning in Excel,  
Data Upload in MySQL



# Game Table

MAIN TABLE  
columns A:D & P



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	Platform	Year_	Genre	Publisher	NA_Sales	EU_JP_	Other_	Global_	Critic_Scor	Critic_Cou	User_Score	User_Cour	Developer	Rating	
2	Wii Sports	Wii	2006	Sports	Nintendo	41.36	29	4	8.45	82.53	76	51	8	322	Nintendo	E
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4	Mario Kart W	Wii	2008	Racing	Nintendo	15.68	13	4	3.29	35.52	82	73	8.3	709	Nintendo	E
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6	Pokemon Red	GB	1996	Role-Playin	Nintendo	11.27	9	10	1	31.37	NULL	NULL	NULL	NULL	NULL	NULL
7	Tetris	GB	1989	Puzzle	Nintendo	23.2	2	4	0.58	30.26	NULL	NULL	NULL	NULL	NULL	NULL
8	New Super M	DS	2006	Platform	Nintendo	11.28	9	7	2.88	29.8	89	65	8.5	431	Nintendo	E
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13	Mario Kart D	DS	2005	Racing	Nintendo	9.71	7	4	1.9	23.21	91	64	8.6	464	Nintendo	E



# Fact & Dimension Tables

## FACT TABLE

F:J sales

## DIMENSION TABLES

critic\_  
review

user\_  
review

Developer

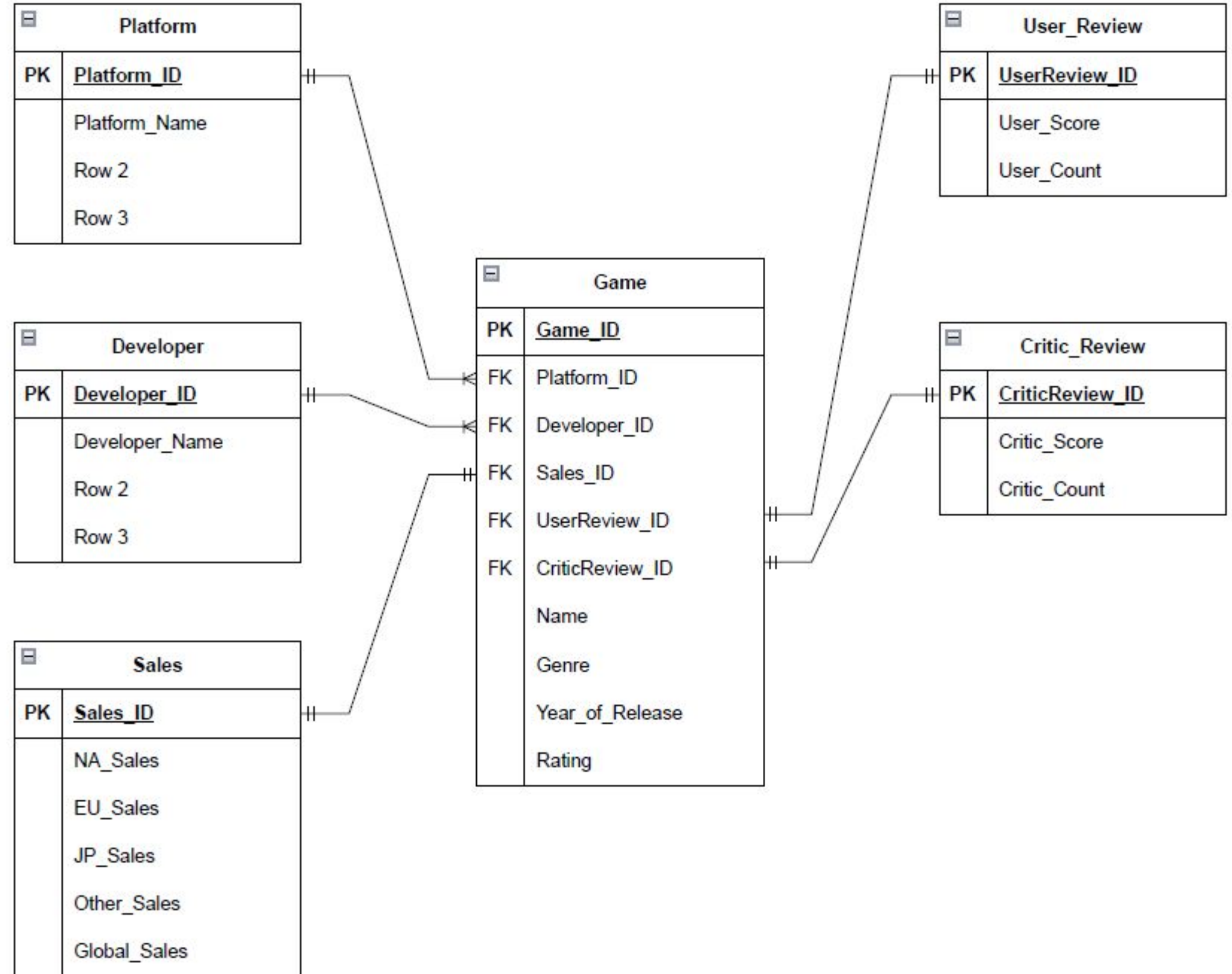
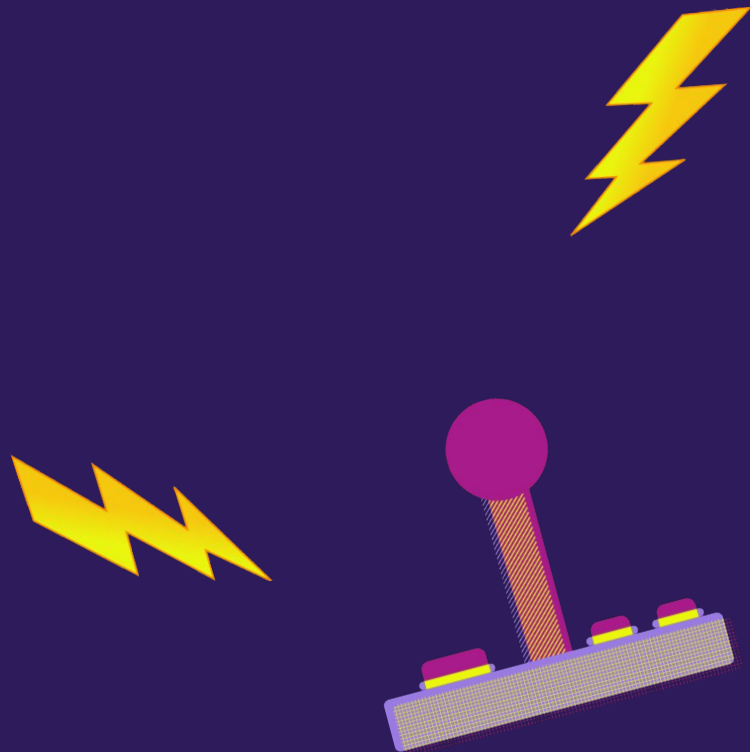
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Name	Platform	Year_	Genre	Publisher	NA_Sales	EU_JP_	Other_	Global_	Critic_Scor	Critic_Cou	User_Score	User_Cour	Developer	Rating	
2	Wii Sports	Wii	2006	Sports	Nintendo	41.36	29	4	8.45	82.53	76	51	8	322	Nintendo	E
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7	Tetris	GB	1989	Puzzle	Nintendo	23.2	2	4	0.58	30.26	NULL	NULL	NULL	NULL	NULL	NULL
8	New Super M	DS	2006	Platform	Nintendo	11.28	9	7	2.88	29.8	89	65	8.5	431	Nintendo	E
9	Wii Play	Wii	2006	Misc	Nintendo	13.96	9	3	2.84	28.92	58	41	6.6	129	Nintendo	E
10	New Super M	Wii	2009	Platform	Nintendo	14.44	7	5	2.24	28.32	87	80	8.4	594	Nintendo	E
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12	Nintendogs	DS	2005	Simulation	Nintendo	9.05	11	2	2.74	24.67	NULL	NULL	NULL	NULL	NULL	NULL
13	Mario Kart D	DS	2005	Racing	Nintendo	9.71	7	4	1.9	23.21	91	64	8.6	464	Nintendo	E



# ERD

## v1.0

Entity Relationship Diagram





# Data Cleaning in Excel



## Correct 'name'

Remove blank, remove strange names starting with .hack, etc., and modify data included with ??



## Fill with 'NULL'

in 'Year\_of\_Release'  
N/A to NULL  
Critic\_score, Critic\_count, User\_score, user\_count, Developer, and Rating were all changed from Blank to NULL.



## Divide into tables

Put into dimensions to Critic\_review, Developer, Platform, Sales, and User\_review tables



## Unique Platform & Developer

Add Developer\_id  
Add Platform information which are released\_year (of platform), Company refer to Wikipedia

# Adding platform information

After Data cleaning in Excel and after uploading data into MySQL

11,491 entries and 17 columns

Find additional information about the platform and add it manually in Excel

*"Super Nintendo" redirects here. For Universal Studios Japan & Hollywood attraction, see [Super Nintendo World](#).*

The **Super Nintendo Entertainment System**, commonly shortened to **Super Nintendo**,<sup>[b]</sup> **Super NES** or **SNES**,<sup>[c]</sup> is a 16-bit home video game console developed by **Nintendo** that was released in 1990 in Japan and South Korea,<sup>[16]</sup> 1991 in North America, 1992 in Europe and Oceania, and 1993 in South America. In Japan, it is called the **Super Famicom (SFC)**.<sup>[d]</sup> In South Korea, it is called the **Super Comboy**<sup>[e]</sup> and was distributed by **Hyundai Electronics**.<sup>[17]</sup> The system was released in Brazil on August 30, 1993,<sup>[16][18]</sup> by **Playtronic**. Although each version is essentially the same, several forms of regional lockout prevent cartridges for one version from being used in other versions.

The Super NES is Nintendo's second programmable home console, following the **Nintendo Entertainment System (NES)**. The console introduced advanced graphics and sound capabilities compared with other systems at the time. It was designed to accommodate the ongoing development of a variety of enhancement chips integrated into game cartridges to be competitive into the next generation.

The Super NES received largely positive reviews and was a global success, becoming the bestselling

## Super Nintendo Entertainment System

**SUPER NINTENDO**  
ENTERTAINMENT SYSTEM

**SUPER FAMICOM**  
スーパーファミコン





# Adding platform information

Before

	A
1	Platform
2	Wii
3	NES
4	GB
5	DS
6	Xbox360
7	PS3
8	PS2
9	SNES
10	GBA
11	PS4
12	3DS
13	N64
14	PS
15	XB
16	PC

manually



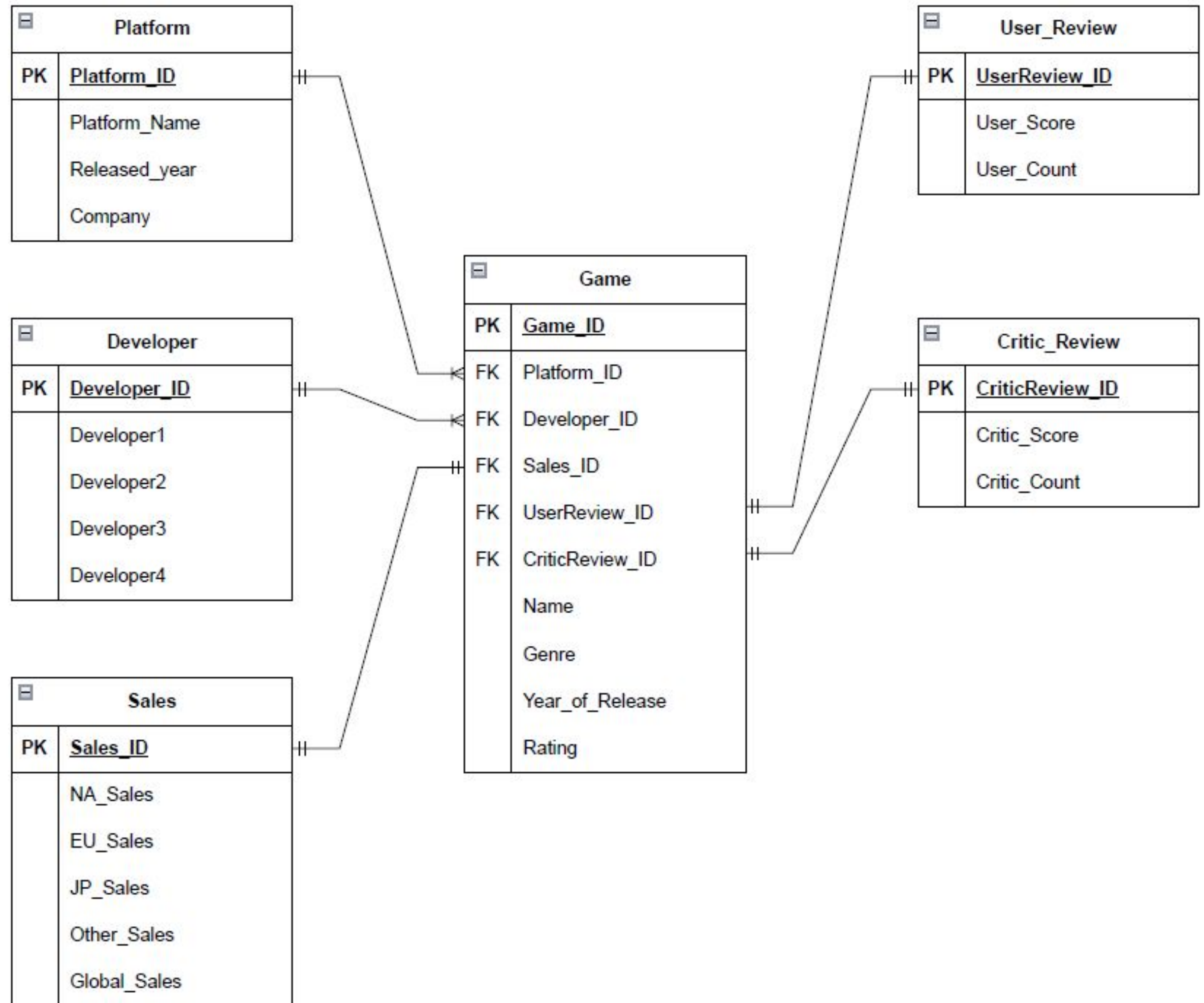
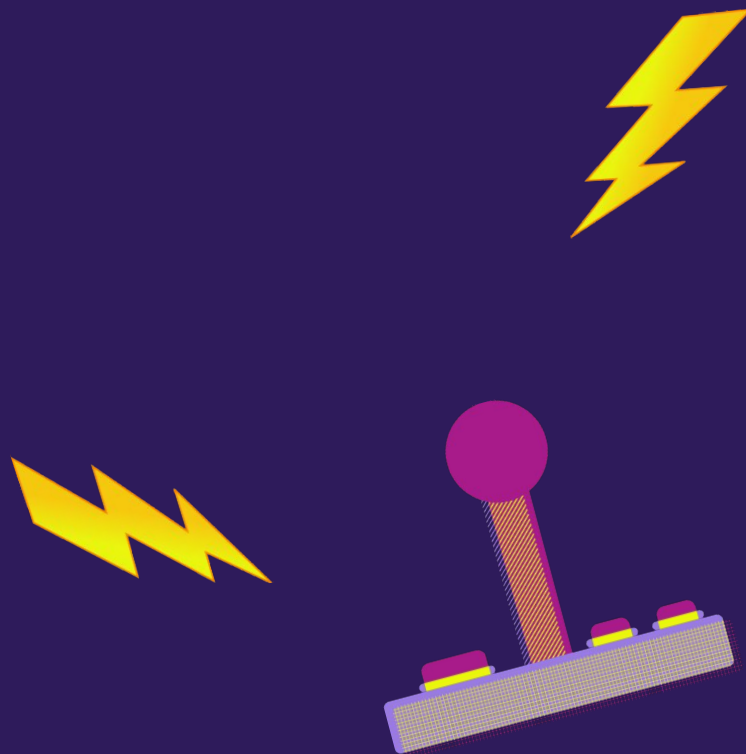
After

	A	B	C
1	Platform	Released_year	Company
2	Wii	2006	Nintendo
3	NES	1985	Nintendo
4	GB	1989	Nintendo
5	DS	2004	Nintendo
6	Xbox360	2005	Microsoft
7	PS3	2006	Sony
8	PS2	2000	Sony
9	SNES	1991	Nintendo
10	GBA	2001	Nintendo
11	PS4	2013	Sony
12	3DS	2010	Nintendo
13	N64	1996	Nintendo
14	PS	1994	Sony
15	XB	2001	Microsoft
16	PC	1998	NEC

# ERD

## v2.0

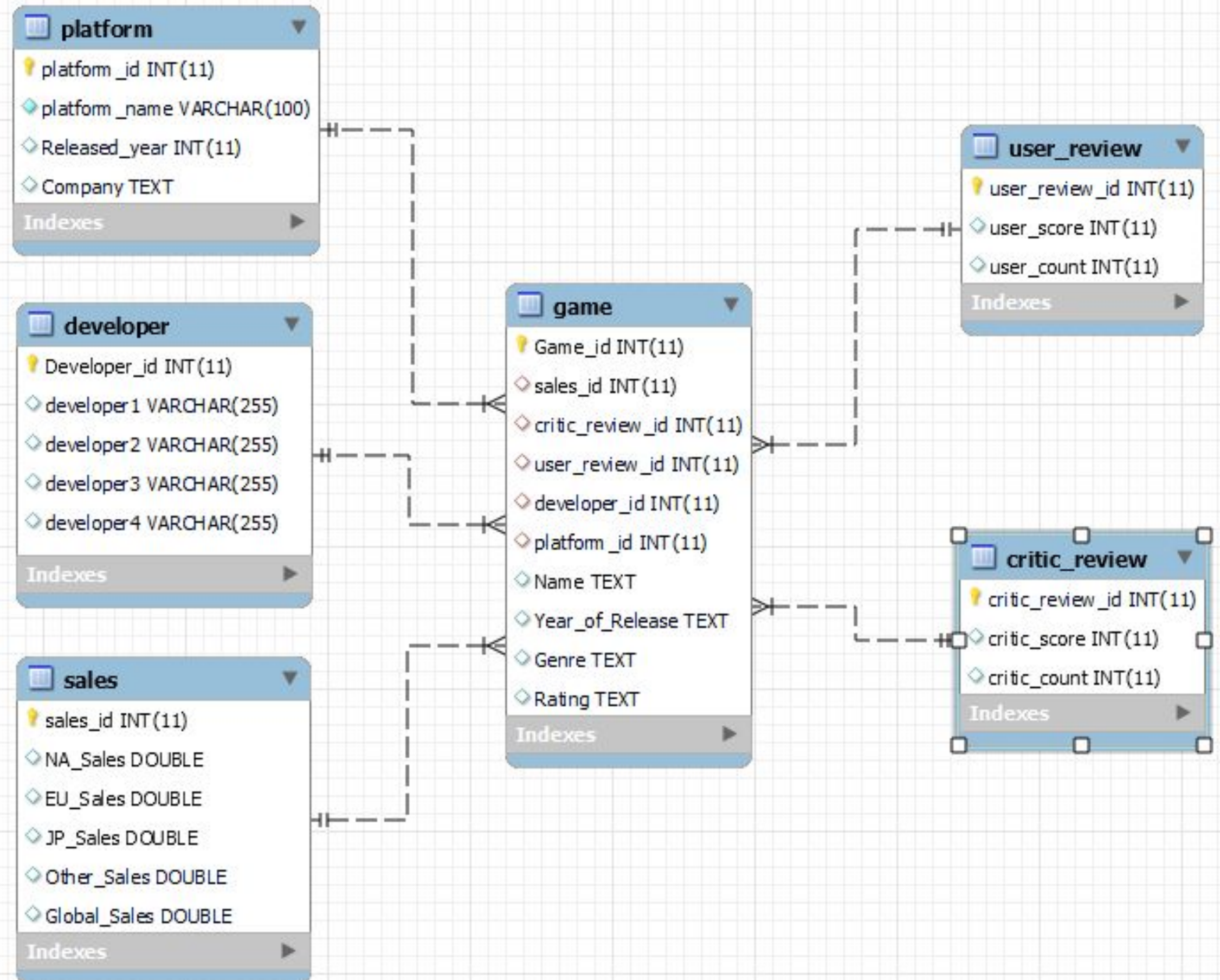
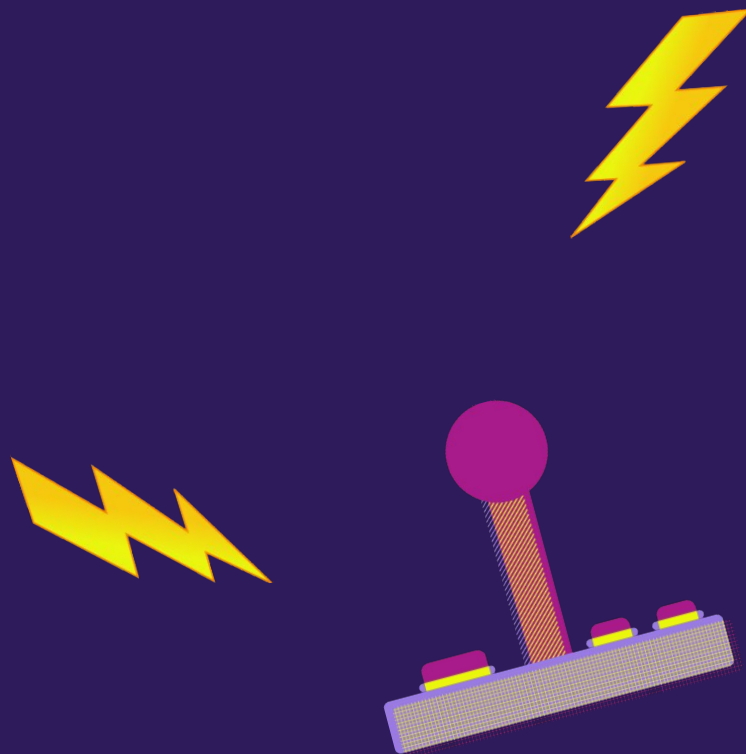
Entity Relationship Diagram





# Final ERD

Entity Relationship Diagram





# MySQL Tables

Game

	A	B	C	D
1	Name	Year_of_Release	Genre	Rating
2	Wii Sports	2006	Sports	E
3	Super Mario Bros.	1985	Platform	NULL
4	Mario Kart Wii	2008	Racing	E
5	Wii Sports Resort	2009	Sports	E
6	Pokemon Red/Pokemon	1996	Role-Playing	NULL
7	Tetris	1989	Puzzle	NULL
8	New Super Mario Bros.	2006	Platform	E
9	Wii Play	2006	Misc	E
10	New Super Mario Bros.	2009	Platform	E
11	Duck Hunt	1984	Shooter	NULL
12	Nintendogs	2005	Simulation	NULL
13	Mario Kart DS	2005	Racing	E
14	Pokemon Gold/Pokemo	1999	Role-Playing	NULL
15	Wii Fit	2007	Sports	E
16	Kinect Adventures!	2010	Misc	E
17	Wii Fit Plus	2009	Sports	E

Critic\_review

	A	B
1	Critic_Score	Critic_Count
2	76	51
3	NULL	NULL
4	82	73
5	80	73
6	NULL	NULL
7	NULL	NULL
8	89	65
9	58	41
10	87	80
11	NULL	NULL
12	NULL	NULL
13	91	64
14	NULL	NULL
15	80	63
16	61	45
17	80	33

User\_review

	A	B
1	User_Score	User_Count
2	8	322
3	NULL	NULL
4	8.3	709
5	8	192
6	NULL	NULL
7	NULL	NULL
8	8.5	431
9	6.6	129
10	8.4	594
11	NULL	NULL
12	NULL	NULL
13	8.6	464
14	NULL	NULL
15	7.7	146
16	6.3	106
17	7.4	52



# MySQL Tables

Sales

	A	B	C	D	E
1	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
2	41.36	28.96	3.77	8.45	82.53
3	29.08	3.58	6.81	0.77	40.24
4	15.68	12.76	3.79	3.29	35.52
5	15.61	10.93	3.28	2.95	32.77
6	11.27	8.89	10.22	1	31.37
7	23.2	2.26	4.22	0.58	30.26
8	11.28	9.14	6.5	2.88	29.8
9	13.96	9.18	2.93	2.84	28.92
10	14.44	6.94	4.7	2.24	28.32
11	26.93	0.63	0.28	0.47	28.31
12	9.05	10.95	1.93	2.74	24.67
13	9.71	7.47	4.13	1.9	23.21
14	9	6.18	7.2	0.71	23.1
15	8.92	8.03	3.6	2.15	22.7
16	15	4.89	0.24	1.69	21.81
17	9.01	8.49	2.53	1.77	21.79

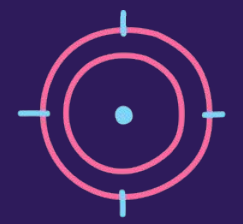
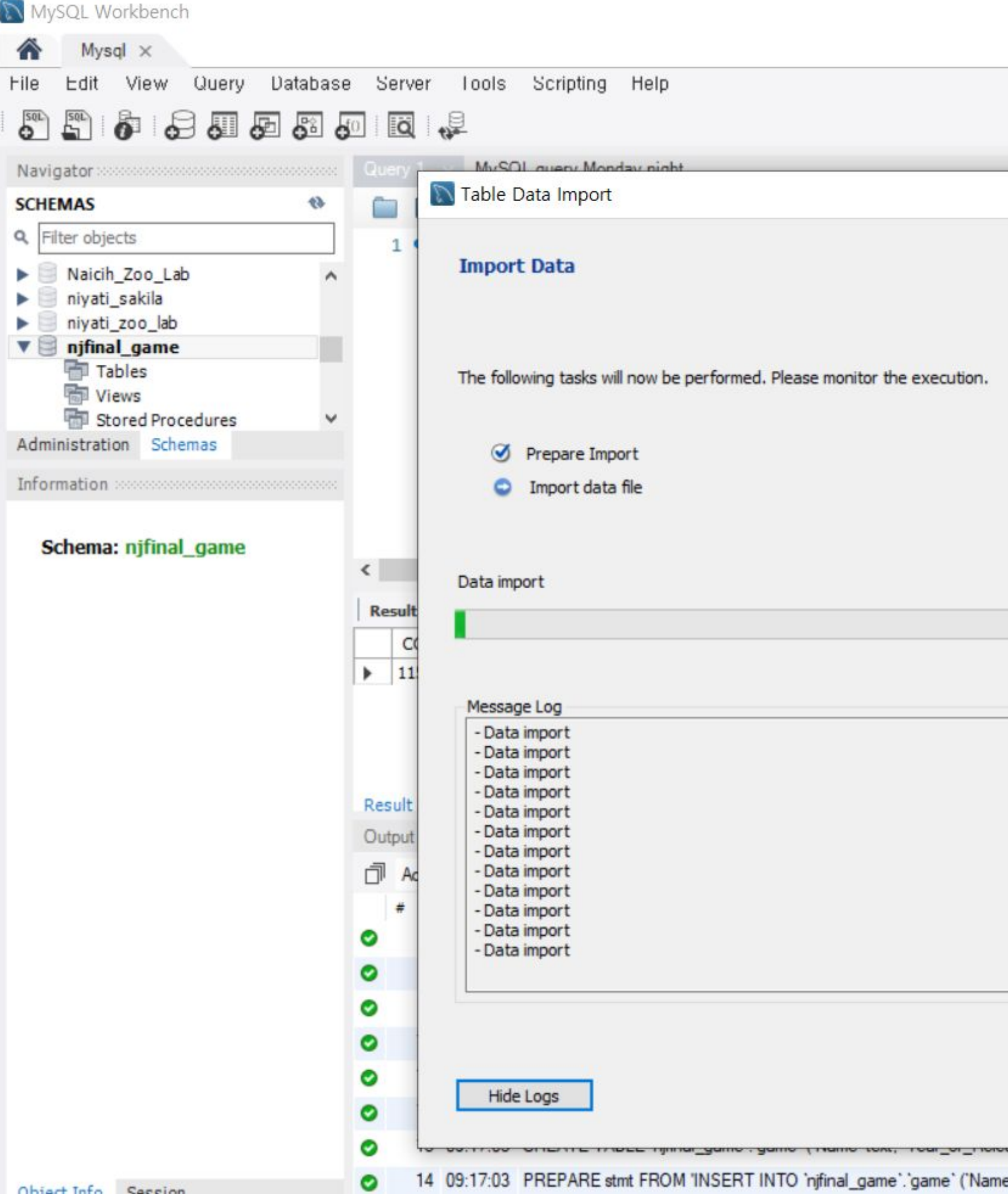
Developer

	A	B
1	Developer_id	Developer_name
2	1	Nintendo
3	2	Good Science Studio
4	3	Rockstar North
5	4	Polyphony Digital
6	5	Infinity Ward, Sledgeham
7	6	Treyarch
8	7	Infinity Ward
9	8	DMA Design
10	9	Game Arts
11	10	Retro Studios, Entertainm
12	11	Bungie Software, Bungie
13	12	Ubisoft
14	13	Bungie
15	14	SquareSoft
16	15	343 Industries
17	16	Hudson Soft

Platform

	A	B	C
1	Platform	Released_year	Company
2	Wii	2006	Nintendo
3	NES	1985	Nintendo
4	GB	1989	Nintendo
5	DS	2004	Nintendo
6	Xbox360	2005	Microsoft
7	PS3	2006	Sony
8	PS2	2000	Sony
9	SNES	1991	Nintendo
10	GBA	2001	Nintendo
11	PS4	2013	Sony
12	3DS	2010	Nintendo
13	N64	1996	Nintendo
14	PS	1994	Sony
15	XB	2001	Microsoft
16	PC	1998	NEC
17	2600	1977	Atari, Inc.






# Data Upload into MySQL

Upload 6 Divided Excel CSV files each. Perhaps because of the large amount of data, it takes more than 2 hours just to upload one 'game' table.





# 3. Assign 'id', PK & FK Answering Business Questions

Assign 'id' in MySQL

Making PK & FK relationship in MySQL

Answering business questions by MySQL queries

# Add 'table\_id' in each table as Primary key

```
ALTER TABLE sales  
ADD COLUMN sales_id INT NOT  
NULL auto_increment Primary Key;
```

sales_id	NA_Sales	EU_Sales	JP_Sales	Other_Sales
1	41.36	28.96	3.77	8.45
2	29.08	3.58	6.81	0.77
3	15.68	12.76	3.79	3.29
4	15.61	10.93	3.28	2.95
5	11.27	8.89	10.22	1
6	23.2	2.26	4.22	0.58
7	11.28	9.14	6.5	2.88
8	13.96	9.18	2.93	2.84
9	14.44	6.94	4.7	2.24
10	26.93	0.63	0.28	0.47
11	9.05	10.95	1.93	2.74
12	9.71	7.47	4.13	1.9
13	9	6.18	7.2	0.71
14	8.92	8.03	3.6	2.15
15	15	4.89	0.24	1.69
16	9.01	8.49	2.53	1.77
17	7.02	9.09	0.98	3.96
18	9.43	0.4	0.41	10.57
19	12.78	3.75	3.54	0.55
20	4.74	9.2	4.16	2.04



# Add 'table\_id' in game table as Foreign key

```
ALTER TABLE game  
ADD FOREIGN KEY (sales_id)  
REFERENCES sales(sales_id)
```

Game_id	sales_id	critic_review_id
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15

...

# Multiple Developers into 1NF

SET

```
developer1 = SUBSTRING_INDEX(developer_name, ',', 1),  
developer2 = CASE WHEN LENGTH(developer_name) -  
LENGTH(REPLACE(developer_name, ',', '')) >= 1 THEN
```

```
SUBSTRING_INDEX(SUBSTRING_INDEX(developer_name,  
, ',', 2), ',', -1) ELSE NULL END,
```

(...) to developer4

Because MAX(comma\_count) is 3

Developer_name
Epic Games
Pipeworks Software, Inc.
Rockstar San Diego
Retro Studios
Blizzard Entertainment
Reflections Interactive
Rare Ltd.
KCEJ
Kojima Productions
Square Enix
SCE/WWS, Media Molecule



Developer_name
Epic Games
Pipeworks Software, Inc.
Rockstar San Diego
Retro Studios
Blizzard Entertainment
Reflections Interactive
Rare Ltd.
KCEJ
Kojima Productions
Square Enix
SCE/WWS, Media Molecule

**Delete  
like 'Inc.'  
after ,**

**into 1NF  
Atomic**

Developer_id	developer1	developer2	developer3	developer4
1	Nintendo	NULL	NULL	NULL
2	Good Scienc...	NULL	NULL	NULL
3	Rockstar North	NULL	NULL	NULL
4	Polyphony D...	NULL	NULL	NULL
5	Infinity Ward	Sledgeha...	NULL	NULL
6	Treyarch	NULL	NULL	NULL
7	Infinity Ward	NULL	NULL	NULL
8	DMA Design	NULL	NULL	NULL
9	Game Arts	NULL	NULL	NULL
10	Retro Studios	Entertain...	NULL	NULL
11	Bungie Soft...	Bungie	NULL	NULL
12	Ubisoft	NULL	NULL	NULL
13	Bungie	NULL	NULL	NULL
14	SquareSoft	NULL	NULL	NULL
15	343 Industries	NULL	NULL	NULL



# Business Questions

## ★ Question One

Which gaming platform has the largest number of games available?

## ★ Question Two

Which gaming platform has the highest total sales?

## ★ Question Three

What are the average sales figures for each gaming platform?

## ★ Question Four

Which game genre has the highest total sales average?

## ★ Question Five

Comparison of the top 10 games by critic score and the top 10 games by user score, along with their sales figures.





# Business Questions

## 🌟 Question One

Which gaming platform has the largest number of games available?

A: PS2 (1624),  
DS (1269),  
PS3 (1065)

platform	platform_	number_of_games
2000	PS2	1624
2004	DS	1269
2006	PS3	1065
2005	Xbox360	1041
2006	Wii	998
1994	PS	970
2005	PSP	635
2001	XB	574
2001	GBA	550
2001	GC	383
1998	PC	355

**Top1:  
PS2 (1624)**





# Business Questions



## Question One -1

Which gaming platform has the largest number of games available?

**After 2012**

A: PS4 (267), PS3 (222), XOne (171), 3DS (163), Xbox360 (139)

platform	platform_name	number_of_games
2013	PS4	267
2006	PS3	222
2013	XOne	171
2010	3DS	163
2005	Xbox360	139
2012	PSV	116
1998	PC	93
2012	WiiU	81
2005	PSP	5
2006	Wii	
2004	DS	

**Top1  
(2012~now)  
PS4 (267)**





# Business Questions

## Question Two

Which gaming platform has the highest total sales in games?

A: PS2 (1231.88),  
Xbox360 (960.74),  
PS3 (927.61)

	platform	platform_	total_sales
2000	PS2		1231.88
2005	Xbox360		960.74
2006	PS3		927.61
2006	Wii		854.43
2004	DS		730.54
1994	PS		615.15
2013	PS4		537.37
2001	GBA		477.74
2005	PS2		431.31
1989	GB		255.11

**Top1:**  
**PS2 (1231.88)**



# Business Questions



## Question Three

What are the average sales figures for each gaming platform?

A: GB (2.74),  
NES (2.61),  
GEN (1.63)

Top1:  
**GAME BOY**



platform	average_sales
GB	2.74
NES	2.61
GEN	1.63
PS4	1.16
SNES	1.00
XOne	0.92
Xbox...	0.92
Wii	0.90
PS3	0.87
SCD	0.82
N64	0.78



# Business Questions

## Question Four

Which game genre has the highest total sales average?

A: Platform (1.18),  
Shooter (1.06),  
Role-playing (0.87)

genre	genre_avg_sales
Platform	1.18
Shooter	1.06
Role-Playing	0.87
Racing	0.79
Sports	0.71
Action	0.71
Puzzle	0.70
Fighting	0.69
Simulation	0.67
Misc	0.65

# Platform Genre Game

A platformer (also called a platform game, and sometimes a jump 'n' run game) is a sub-genre of action video games in which the core objective is to move the player character between points in an environment.





# Business Questions

## Question Five

Comparison of the top 10 games by critic score and the top 10 games by user score, along with their sales figures.

game	u_score	game	c_score
Golden Sun The Lost ...	10	Grand Theft Auto IV	98
Harvest Moon Friend...	10	Grand Theft Auto IV	98
MLB SlugFest Loaded	10	Tony Hawk's Pro S...	98
Boktai The Sun is in Y...	10	SoulCalibur	98
Cory in the House	10	Grand Theft Auto V	97
Super Puzzle Fighter II	10	Grand Theft Auto V	97
New Super Mario Bros.	9	Grand Theft Auto III	97
Mario Kart DS	9	Grand Theft Auto V	97
Grand Theft Auto Sa...	9	Super Mario Galaxy	97
Grand Theft Auto Vic...	9	Super Mario Galaxy 2	97



# Insights of MySQL Data Analysis

## 🌟 One

Importance of ERD for building a database

## 🌟🌟 Two

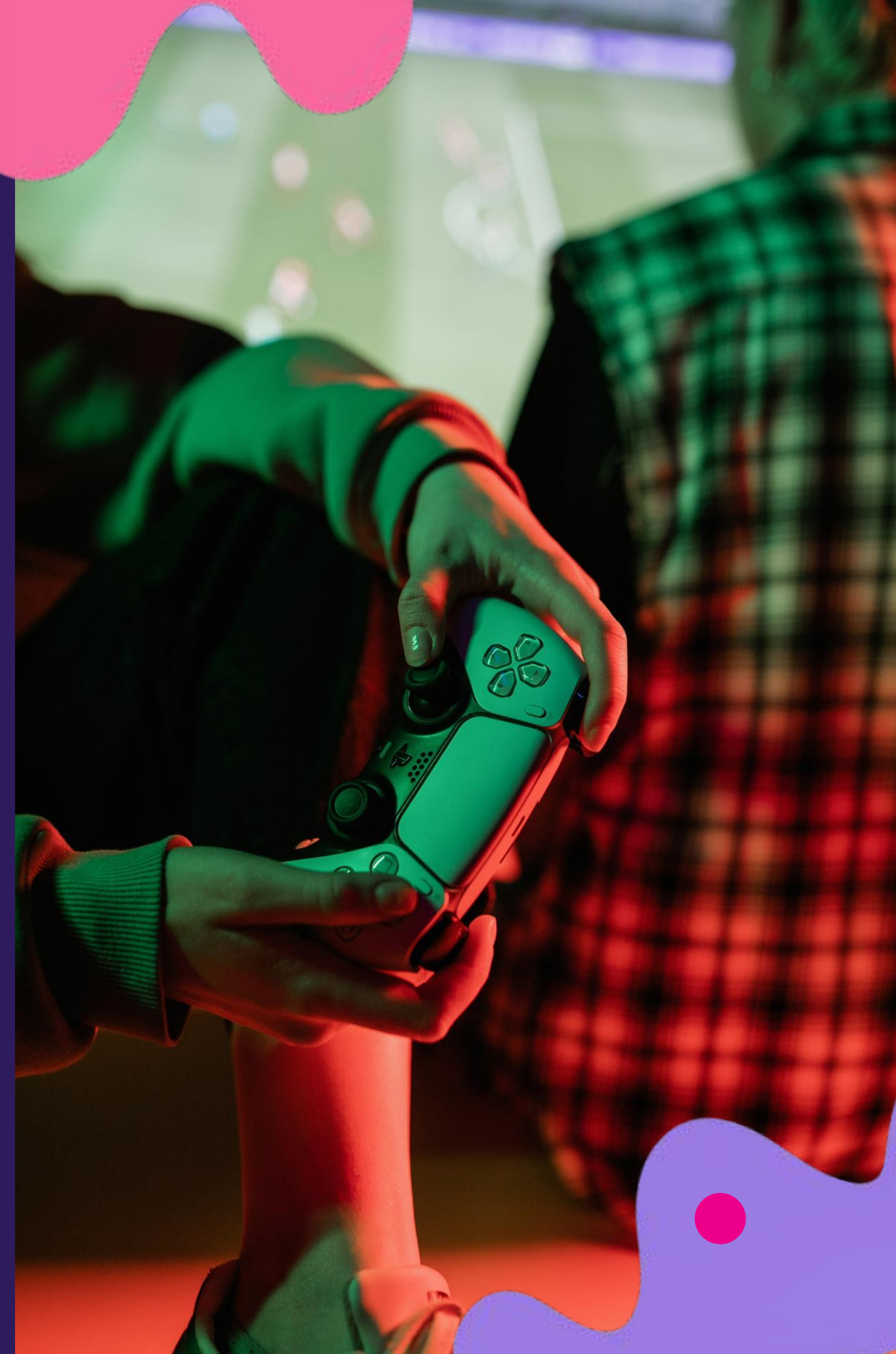
Data Cleaning time takes up a large portion of all tasks.

## 🌟🌟🌟 Three

After building data, it is easy to answer many questions.

## 🌟🌟🌟🌟 Four

If analyzed with an expert with domain knowledge, it can be utilized more business-wise.





**Thank you!**

Do You Have Any Questions?







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