# CPSC 304 Project Cover Page

Milestone #: \_\_2\_\_\_

Date: \_\_\_\_July 21<sup>st</sup> 2024\_\_\_\_\_

Group Number: \_\_\_\_14

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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.)

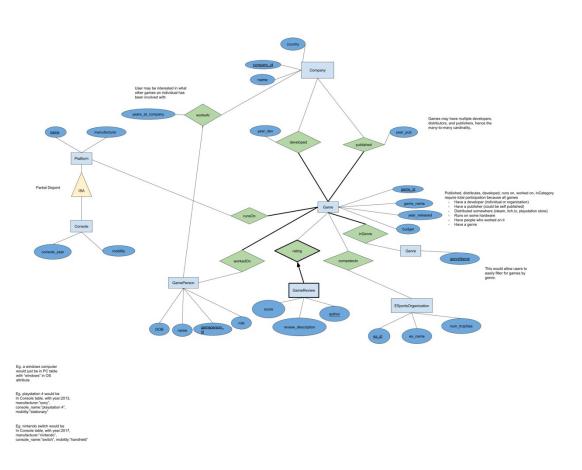
In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

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# **Summary of the Project:**

The domain of the project is the video game industry. This application aims to describe the comprehensive database for game enthusiasts, researchers, and industry professionals to easily access and analyze data related to video game development, publishing, and distribution. Users will be able to find information about various games including developer and publisher, genre, platforms the game runs on, and people involved with the games.

# **ER Diagram:**



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Our group originally had ISA relation between Company and (Studio, Distributor and Publisher), but we found that there are redundancies in Studio and Company. We decided to incorporate an ISA relationship with platforms instead, and use a role attribute for the company to record if the company is a studio or a publisher. Since PC operating systems, phone operating systems, and console names are trademarked, we decided to use the name as the key.

We also added an entity for Esports teams, as users may be interested in what games are played competitively and what teams play.

We then fixed our missing bolded boxes to show that GameReviews are a weak entity owned by Games. We also added an arrow from GamePerson to worksAt to show that each GamePerson is assumed to work for one company.

# **Schema derived from the ER Diagram:**

#### a. List the table definition

Game(game\_id: INTEGER, game\_name: VARCHAR, year\_released: INT, budget: INT)

GameReviewRating(game\_id: INT, author: VARCHAR, review\_description: TEXT, score: INT)

we are assuming that one author will only write one review for each game, and that author names will be unique.
GameReview and rating are combined since GameReview is a weak entity.

Genre(genreName: VARCHAR)

inGenre(game\_id: INT, genreName: VARCHAR)

we store Genre and inGenre in separate tables since each game can have many different genres.

Platform(name: VARCHAR, manufacturer: VARCHAR)

Console(name: VARCHAR, console\_year: INT, mobility: VARCHAR)

runsOn(game\_id: INT, name: VARCHAR)

Company (company id: INT, country: VARCHAR, company name: VARCHAR)

developed(game_id: INT, company_id: INT, year_dev: INT)		
published(game_id: INT, company_id: INT, year_pub: INT)		
GamePerson(gameperson_id: INT, name: VARCHAR, date_of_birth: DATE, role: VARCHAR)		
workedOn(gameperson_id: INT, game_id: INT)		
worksAt(gameperson_id: INT, years_at_company: INT, company_id)		
ESportsOrganization(es_id: INT, es_name: VARCHAR, num_trophies: INT)		
CompetesIn(game_id: INT, es_id: INT)		
b. Specify the primary key (PK), candidate key, (CK) foreign keys (FK), and other constraints		
Primary Keys:		
Game: game_id GameReview: author, game_id Genre: genreName inGenre: game_id, genreName Platform: name Console: name runsOn: game_id, name Company: company_id developed: game_id, company_id published: game_id, company_id GamePerson: gameperson_id workedOn: gameperson_id, game_id worksAt: gameperson_id ESportsOrganization: es_id CompetesIn: game_id, es_id		
Candidate Keys:		
□ Same as Primary Keys		
Foreign Keys:		
<ul><li>□ Game:</li><li>□ GameReviewRating: game_id</li></ul>		

	Genre:
	inGenre: game_id, genreName
	Platform:
	Console: name
	runsOn: game_id, name
	Company:
	developed: game_id, company_id
	published: game_id, company_id
	GamePerson:
	workedOn: gameperson_id, game_id
	worksAt: gameperson_id, company_id)
	ESportsOrganization:
	CompetesIn: game_id, es_id
<u>Funct</u>	tional Dependencies:
Basis:	
	2 different games may have the same name, published in the same year and have the
	same budget (many indie games have 0 budget).
	Games can have multiple genres and run on multiple platforms
	Games may be developed by multiple companies and published by multiple companies
	A single manufacturer may release 2 consoles in the same year (eg. Nintendo DS and
	Game Boy Micro) but console names are trademarked
	We are assuming one author writes one review for $\geq 1$ games. the author may give the same score to multiple games
compa	any_id → company_name, country
game_	_id → game_name, year, budget
game_	_id, author→ score, review_description
game_	_id, year_dev→ company_id
game_	_id, year_pub→ company_id
autho	r, review_description → game_id, score
autho	r, game_id → review_description, score
gamer	person_id → date_of_birth, name, role, company_id, years_at_company, company_name

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```
company_id, year_pub → game_id

company_id, year_dev → game_id

name → manufacturer

name →manufacturer, mobility, console_year

es_id → es_name, num_trophies
```

# **Normalization:**

In addition to our above FDs which sometimes span between relations, we considered intrarelation attributes and FDs as well. However, we decided that no further normalization needs to be done. For instance, games may have the same name (especially smaller indie titles, but consider there are two different games named "Call of Duty: Modern Warfare" due to recent franchise reboots) but be different games. The year does not determine anything about the game, nor the budget.

The same is true of ESportsOrganization, GameReview, GamePerson, Platform, and Company. Names themselves are generally not indicative of any other attributes because two different tuples may have the same name. more than one tuples GamePerson may have the same name, DOB, and role. GameReview will certainly have various users provide the same score, and may write the same review. Many companies can be based in the same country and there is the possibility of companies having the same name, especially in the indie space. Platform manufacturers release many different consoles in the same year with the same mobility class. Therefore, we have various ID that determine other attributes such that we do not need to normalize.

#### **SQL DDL Statements:**

```
🖒 복사 캡션 👓
CREATE TABLE Game(
  game_id INT PRIMARY KEY,
  game_name VARCHAR,
 year_released INT,
  budget INT,
CREATE TABLE GameReviewRating (
  game_id INT NOT NULL,
  author VARCHAR,
  review_description TEXT,
  score FLOAT,
  PRIMARY KEY (game_id, author),
  FOREIGN KEY (game_id)
   REFERENCES Game(game_id)
    ON DELETE CASCADE
CREATE TABLE Genre (
  genre_name VARCHAR PRIMARY KEY,
CREATE TABLE GamePerson (
  gameperson_id INT PRIMARY KEY,
  DOB DATE,
 name VARCHAR,
  role VARCHAR,
CREATE TABLE Company(
  company_id INT PRIMARY KEY,
  company_name CHAR(30),
  country CHAR(30),
CREATE TABLE ESportsOrganization(
  es_id INT PRIMARY KEY,
  num_trophies INT,
  es_name VARCHAR
CREATE TABLE Platform (
  name VARCHAR PRIMARY KEY,
  manufacturer VARCHAR
```

```
CREATE TABLE Console (
 name VARCHAR PRIMARY KEY,
 console_year INT,
 mobility VARCHAR,
 FOREIGN KEY (name)
    REFERENCES Platform(name)
   ON DELETE CASCADE
-- Relationships
CREATE TABLE inGenre(
 game_id INT,
 genre_name VARCHAR,
 PRIMARY KEY (game_id, genre_name),
 FOREIGN KEY (game_id)
    REFERENCES Game(game_id)
    ON DELETE CASCADE,
 FOREIGN KEY (genre_name)
    REFERENCES Genre(genre_name)
   ON DELETE CASCADE
CREATE TABLE CompetesIn (
 es_id INT,
 game_id INT,
 PRIMARY KEY (es_id, game_id),
 FOREIGN KEY (es_id)
   REFERENCES ESportsOrganization(es_id)
    ON DELETE CASCADE,
 FOREIGN KEY (game_id)
    REFERENCES Game(game_id)
    ON DELETE CASCADE
CREATE TABLE worksAt (
 gameperson_id INT,
 years_at_company INT,
 company_id INT NOT NULL UNIQUE,
 PRIMARY KEY (gameperson_id),
  FOREIGN KEY (gameperson_id)
    REFERENCES GamePerson(gameperson_id )
    ON DELETE CASCADE
 FOREIGN KEY (company_id)
    REFERENCES Company(company_id)
    ON DELETE CASCADE
```

```
CREATE TABLE workedOn (
 gameperson_id INT,
 game_id INT,
 PRIMARY KEY (gameperson_id , game_id),
 FOREIGN KEY (gameperson_id )
   REFERENCES GamePerson(gameperson_id )
   ON DELETE CASCADE,
 FOREIGN KEY (game_id)
   REFERENCES Game(game_id)
   ON DELETE CASCADE
CREATE TABLE runsOn (
 name VARCHAR,
 game_id INT,
 PRIMARY KEY (name, game_id),
 FOREIGN KEY (name)
   REFERENCES Platform(name)
   ON DELETE CASCADE,
 FOREIGN KEY (game_id)
   REFERENCES Game(game_id)
   ON DELETE CASCADE
CREATE TABLE Developed (
 company_id INT,
 game_id INT,
 year_dev INT,
 PRIMARY KEY (company_id, game_id),
 FOREIGN KEY (company_id)
   REFERENCES Company(company_id)
   ON DELETE CASCADE,
 FOREIGN KEY (game_id)
   REFERENCES Game(game_id)
   ON DELETE CASCADE
```

```
CREATE TABLE Published (
   company_id INT,
   game_id INT,
   year_pub INT,
   PRIMARY KEY (company_id, game_id),
   FOREIGN KEY (company_id)
     REFERENCES Company(company_id)
     ON DELETE CASCADE,
   FOREIGN KEY (game_id)
     REFERENCES Game(game_id)
   ON DELETE CASCADE
)
```

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#### INSERT statements to populate each table with at least 5 tuples.

```
-- Game
-- Entity
-- INSERT INTO Game VALUES (game_id, game_name, year_released, budget)
INSERT INTO Game VALUES (169250, "League Of Legends", 2009, 100000000)
INSERT INTO Game VALUES (254931, "Valorant", 2020, 20000000)
INSERT INTO Game VALUES (375192, "Maplestory", 2003, 30000)
INSERT INTO Game VALUES (491938, "Fifa Online 4", 2018, 50000)
INSERT INTO Game VALUES (532918, "Minecraft", 2011, 0)
INSERT INTO Game VALUES (681029, "Starcraft", 1998, 100000000)
INSERT INTO Game VALUES (728102, "Grand Theft Auto V", 2013, 137000000)
INSERT INTO Game VALUES (976510, "Gran Turismo", 2009, 100000)
INSERT INTO Game VALUES (982091, "Call of Duty: Mobile", 2019, 35000)
```

```
-- Developed
-- INSERT INTO Developed VALUES (Company(company_id), Game(game_id), year_dev)
INSERT INTO Developed VALUES (100, 169250, 2009) -- LOL
INSERT INTO Developed VALUES (100, 254931, 2020) -- Valorant
INSERT INTO Developed VALUES (101, 532918, 2011) -- Minecraft
INSERT INTO Developed VALUES (103, 375192, 2003) -- Maplestory
INSERT INTO Developed VALUES (103, 491938, 2018) -- Fifa Online 4
INSERT INTO Developed VALUES (104, 681029, 1998) -- Starcraft
INSERT INTO Developed VALUES (105, 728102, 2013) -- GTA V
-- Published
-- Relation
-- INSERT INTO Published VALUES (Company(company id), Game(game_id), year_pub)
INSERT INTO Published VALUES (100, 169250, 2009) -- LOL
INSERT INTO Published VALUES (100, 254931, 2020) -- Valorant
INSERT INTO Published VALUES (101, 532918, 2011) -- Minecraft
INSERT INTO Published VALUES (106, 532918, 2011) -- Minecraft
INSERT INTO Published VALUES (107, 532918, 2011) -- Minecraft
INSERT INTO Published VALUES (103, 375192, 2003) -- Maplestory
INSERT INTO Published VALUES (103, 491938, 2018) -- Fifa Online 4
INSERT INTO Published VALUES (104, 681029, 1998) -- Starcraft
INSERT INTO Published VALUES (105, 728102, 2013) -- GTA V
-- Company
-- INSERT INTO Company VALUES (company_id, company_name, country)
INSERT INTO Company VALUES (100, "Riot Games", "United States")
INSERT INTO Company VALUES (101, "Mojang Studios", "Sweden")
INSERT INTO Company VALUES (102, "Electronic Arts", "United States")
INSERT INTO Company VALUES (103, "Nexon", "Korea, Republic of")
INSERT INTO Company VALUES (104, "Activision Blizzard", "United States")
INSERT INTO Company VALUES (105, "Rockstar Games", "United States")
INSERT INTO Company VALUES (106, "Xbox Game Studios", "United States")
INSERT INTO Company VALUES (107, "Sony Interactive Entertainment", "Japan")
-- worksAt
-- Relation
-- INSERT INTO worksAt VALUES (GamePerson(gameperson_id), years_at_company, Company
INSERT INTO worksAt VALUES (1001, 18, 100) -- Brandon Beck, Riot Games
INSERT INTO worksAt VALUES (1002, 18, 100) -- Marc Merrill, Riot Games
INSERT INTO worksAt VALUES (1003, 25, 103) -- Jung-ju Kim, Nexon
INSERT INTO worksAt VALUES (1004, 20, 104) -- Michael Morhaime, Blizzard
INSERT INTO worksAt VALUES (1005, 13, 101) -- Markus Persson, Mojang Studios
INSERT INTO worksAt VALUES (1006, 26, 105) -- Sam Houser, Rockstar Games
INSERT INTO worksAt VALUES (1007, 18, 107) -- Hideaki Nishino, Sony Interactive En
INSERT INTO worksAt VALUES (1008, 18, 107) -- Hermen Hulst, Sony Interactive Enter
```

```
-- GamePerson
-- Entity
-- INSERT INTO GamePerson VALUES (game_person_id, DOB, name, role)
INSERT INTO GamePerson VALUES (1001, "1982-04-10", "Brandon Beck", "Co-Founder")
INSERT INTO GamePerson VALUES (1002, "1980-08-17", "Marc Merrill", "Co-Founder")
INSERT INTO GamePerson VALUES (1003, "1968-02-22", "Jung-ju Kim", "Founder")
INSERT INTO GamePerson VALUES (1004, "1967-11-03", "Michael Morhaime", "Co-Founder
INSERT INTO GamePerson VALUES (1005, "1979-06-01", "Markus Persson", "Founder")
INSERT INTO GamePerson VALUES (1006, "1971-11-03", "Sam Houser", "Co-Founder")
INSERT INTO GamePerson VALUES (1007, NULL, "Hideaki Nishino", "CEO")
INSERT INTO GamePerson VALUES (1008, "1971-03-01", "Hermen Hulst", "CEO")
-- worked0n
-- Relation
-- INSERT INTO works0n VALUES (1001, 169250)
INSERT INTO workedOn VALUES (1001, 169250) -- "Brandon Beck", LOL
INSERT INTO workedOn VALUES (1002, 169250) -- "Marc Merrill", LOL
INSERT INTO workedOn VALUES (1001, 254931) -- "Brandon Beck", Valorant
INSERT INTO workedOn VALUES (1002, 254931) -- "Marc Merrill", Valorant
INSERT INTO workedOn VALUES (1003, 375192) -- "Jung-ju Kim", Maplestory
INSERT INTO workedOn VALUES (1003, 491938) -- "Jung-ju Kim", Fifa Online 4
INSERT INTO workedOn VALUES (1004, 681029) -- "Michael Morhaime", Starcraft
INSERT INTO workedOn VALUES (1005, 532918) -- "Markus Persson", Minecraft
INSERT INTO workedOn VALUES (1006, 728102) -- "Sam Houser", GTA V
```

```
-- inGenre
-- Relation
-- INSERT INTO inGenre VALUES (Game(game)id), Genre(genre_name))
INSERT INTO inGenre VALUES (169250, "MOBA")
                                                 -- LOL, "MOBA"
INSERT INTO inGenre VALUES (254931, "Tactical Shooter") -- Valorant, "Tactical Sho
INSERT INTO inGenre VALUES (254931, "Hero Shooter") -- Valorant, "Hero Shooter
INSERT INTO inGenre VALUES (375192, "RPG")
                                                          -- Maplestory, "RPG"
                                                       -- Fifa Online 4, "Sports"
-- Minecraft, "Survival"
INSERT INTO inGenre VALUES (491938, "Sports")
INSERT INTO inGenre VALUES (532918, "Survival")
INSERT INTO inGenre VALUES (532918, "Sandbox") -- Minecraft, "Sandbox"
INSERT INTO inGenre VALUES (681029, "Strategy") -- Starcraft, "Strategy"
-- Genre
-- Entity
-- INSERT INTO Genre VALUES (genre_name)
INSERT INTO Genre VALUES ("Adventure")
INSERT INTO Genre VALUES ("Action")
INSERT INTO Genre VALUES ("Hero Shooter")
INSERT INTO Genre VALUES ("MMORPG")
INSERT INTO Genre VALUES ("MOBA")
INSERT INTO Genre VALUES ("RPG")
INSERT INTO Genre VALUES ("Sandbox")
INSERT INTO Genre VALUES ("Simulation")
INSERT INTO Genre VALUES ("Sports")
INSERT INTO Genre VALUES ("Strategy")
INSERT INTO Genre VALUES ("Survival")
INSERT INTO Genre VALUES ("Tactical Shooter")
```

```
-- Rating
-- Relation
-- INSERT INTO Rating VALUES (Game(game_id), author, GameReview(description))
-- INSERT INTO Rating VALUES (GameReview(game_id), author, GameReview(description))
-- NOTE: I see some redundancies in this part
INSERT INTO Rating VALUES (169250,
                           "LeaguePlayer1")
INSERT INTO Rating VALUES (178209,
                           "LeaguePlayer2")
INSERT INTO Rating VALUES (254931,
                           "ValorantPlayer1")
INSERT INTO Rating VALUES (375192,
                           "MaplestoryPlayer1")
INSERT INTO Rating VALUES (491938,
                           "FifaPlayer1",)
INSERT INTO Rating VALUES (532918,
                           "MinecraftPlayer1")
```

```
-- GameReview
-- INSERT INTO GameReviewRating VALUES (Game(game_id), author, description, score)
INSERT INTO GameReviewRating VALUES (169250,
                                     "LeaguePlayer1",
                                     "Overall, Its a nice MOBA Game, the learning
                                      may be steep but as you progress and learn it
                                      learning the different champions in the game,
INSERT INTO GameReviewRating VALUES (178209,
                                     "LeaguePlayer2",
                                     "Best game ever!",
                                      4.5)
INSERT INTO GameReviewRating VALUES (254931,
                                     "ValorantPlayer1",
                                     "Valorant has taken the gaming world by storm
                                     its release in 2020, quickly becoming one of
                                     games in the competitive gaming scene.",
                                     3.8)
INSERT INTO GameReviewRating VALUES (178209,
                                     "LeaguePlayer2",
                                     "Valorant is the worst game ever. League of Le
                                     way better.",
                                     2.1)
INSERT INTO GameReviewRating VALUES (375192,
                                     "MaplestoryPlayer1",
                                     "I have played this game since It's beta relea
                                     I have been apart of every update this game ha
                                     then and I must say it was like watching a bes
                                     3.0)
INSERT INTO GameReviewRating VALUES (491938,
                                     "FifaPlayer1",
                                     "I have been a Fifa player since fifa 97 and
                                     disappointments with it. Fifa 23 is a huge imp
                                     have to play sensible. ",
                                     3.4)
INSERT INTO GameReviewRating VALUES (532918,
                                     "MinecraftPlayer1",
                                     "this game is actually amazing",
                                     4.5)
INSERT INTO GameReviewRating VALUES (681029,
                                     "StarcraftPlayer1",
                                     "spend more than half of my life playing this
                                     everything was just too good. ",
                                     4.9)
```

```
-- CompetesIn
-- Relation
-- INSERT INTO CompetesIn VALUES (ESportsOrganization(es_id), Game(game_id))
INSERT INTO CompetesIn VALUES (10000, 169250) -- SK Telecome T1, LOL
INSERT INTO CompetesIn VALUES (10001, 254931) -- SK Telecome T1, Valorant
INSERT INTO CompetesIn VALUES (10002, 169250) -- Cloud9, LOL
INSERT INTO CompetesIn VALUES (10003, 169250) -- Team Liquid, LOL
INSERT INTO CompetesIn VALUES (10004, 169250) -- G2 Esports, LOL
INSERT INTO CompetesIn VALUES (10005, 169250) -- 100 Thieves, LOL
INSERT INTO CompetesIn VALUES (10006, 169250) -- Fnatic, LOL
-- ESportsOrganization
-- Entity
-- INSERT INTO ESportsOrganization VALUES (es_id, num_trophies, es_name)
INSERT INTO ESportsOrganization VALUES (10000, 7, "SK Telecom T1")
INSERT INTO ESportsOrganization VALUES (10001, 3, "SK Telecom T1")
INSERT INTO ESportsOrganization VALUES (10002, 2, "Cloud9")
INSERT INTO ESportsOrganization VALUES (10003, 1, "Team Liquid")
INSERT INTO ESportsOrganization VALUES (10004, 4, "G2 Esports")
INSERT INTO ESportsOrganization VALUES (10005, 2, "100 Thieves")
INSERT INTO ESportsOrganization VALUES (10006, 2, "Fnatic")
```

```
-- runs0n
-- Relation
-- INSERT INTO runsOn VALUES (Platform(platform_id), Game(game_id))
INSERT INTO runsOn VALUES ("Windows", 254931) -- Windows, Valorant
INSERT INTO runsOn VALUES ("MacOS", 169250) -- MacOS, LOL
INSERT INTO runsOn VALUES ("Xbox 360", 532918) -- Xbox 360, Minecraft
INSERT INTO runsOn VALUES ("Xbox One", 491938) -- Xbox One, FIFA 18
INSERT INTO runsOn VALUES ("Playstation 3", 532918) -- Playstation 3, Minecraft
INSERT INTO runsOn VALUES ("Playstation 4", 532918) -- Playstation 4, Minecraft
INSERT INTO runsOn VALUES ("Switch", 532918) -- Nintendo Switch, Minecraft
INSERT INTO runsOn VALUES ("PSP", 976510) -- PSP, Gran Turismo
INSERT INTO runsOn VALUES ("Windows", 681029) -- Window , Starcraft
INSERT INTO runsOn VALUES ("iOS", 982091) -- iOS, Call of Duty: Mobile
INSERT INTO runsOn VALUES ("Android", 982091) -- Android, Call of Duty: Mobile
-- Platform
-- Entity
-- INSERT INTO Platform VALUES (name, manufacturer)
INSERT INTO Platform VALUES ("Windows", "Microsoft")
INSERT INTO Platform VALUES ("MacOS", "Apple")
INSERT INTO Platform VALUES ("Xbox 360", "Microsoft")
INSERT INTO Platform VALUES ("Xbox One", "Microsoft")
INSERT INTO Platform VALUES ("Playstation 3", "Sony")
INSERT INTO Platform VALUES ("Playstation 4", "Sony")
INSERT INTO Platform VALUES ("Switch", "Nintendo")
INSERT INTO Platform VALUES ("PSP", "Sony")
INSERT INTO Platform VALUES ("iOS", "Apple")
INSERT INTO Platform VALUES ("Android", "Google")
-- Console
-- Entity
INSERT INTO Console VALUES (Platform(name),
                            console_year,
INSERT INTO Console VALUES ("Xbox 360", 2005, "Stationary")
INSERT INTO Console VALUES ("Xbox One", 2013, "Stationary")
INSERT INTO Console VALUES ("Playstation 3", 2006, "Stationary")
INSERT INTO Console VALUES ("Playstation 4", 2013, "Stationary")
INSERT INTO Console VALUES ("Switch", 2017, "Mobile")
INSERT INTO Console VALUES ("PSP", 2005, "Mobile")
```