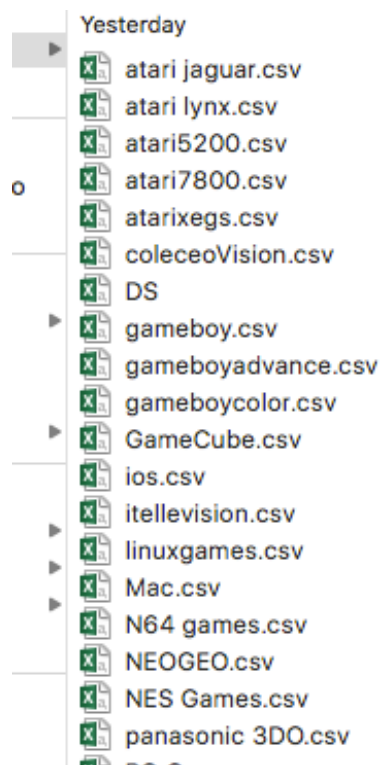Project 4
CS 434
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Program Code For Transforming Data

The data that had for the video game database was all separated into CSV files of games for each platform. IE all Xbox games were in one CSV file. I created a program that took data from each CSV file which was all ordered slightly differently and combined all the video game data files I had into one consistently organized CSV file.

Screen shots of Files:

Yesterday

- atari jaguar.csv
- atari lynx.csv
- atari5200.csv
- atari7800.csv
- atarixegs.csv
- coleceoVision.csv
- DS
- gameboy.csv
- gameboyadvance.csv
- gameboycolor.csv
- GameCube.csv
- ios.csv
- itellevision.csv
- linuxgames.csv
- Mac.csv
- N64 games.csv
- NEOGEO.csv
- NES Games.csv
- panasonic 3DO.csv

Example of A Raw CSV File:

```
                                        ▣ N64 games.csv ˅

64 Trump Collection: Alice no Waku Waku Trump World,1998,Bottom Up,Bottom Up,JP,1—4,—,Card Game
Aero Fighters Assault•Sonic Wings AssaultJP,1997,Paradigm Entertainment,Video System,"JP, NA, PAL",1—4,K—A/3+,Simulation/Flight Combat
AeroGauge,1997,Pacific Coast Power & Light,ASCII Entertainment,"JP, NA, PAL",1—2,E/3+,Racing/Automobile
AI Shogi 3,1998,I4,I4,JP,1—4,—,Board Game/Strategy
Aidyn Chronicles: The First Mage,2001,H2O Interactive,THQ,"NA, PAL",1,T/11+,Adventure/Role Playing
Air Boarder 64,1998,Human Entertainment,Human Entertainment,"JP, PAL",1—2,—/3+,Sports/Stunts
All-Star Baseball 99,1998,Acclaim,Acclaim,"NA, PAL",1—4,E/3+,Sports/Baseball
All-Star Baseball 2000,1999,Acclaim,Acclaim,"NA, PAL",1—4,E/3+,Sports/Baseball
All-Star Baseball 2001,2000,Acclaim,Acclaim,NA,1—4,E/—,Sports/Baseball
All Star Tennis '99•Yannick Noah All Star Tennis '99FRA,1999,Smart Dog,Ubisoft,"NA, PAL",1—4,E/3+,Sports/Tennis
Animal Crossing•Dobutsu no MoriJP,2001,Nintendo,Nintendo,JP,1,—,Simulation/Living/Social
Armorines: Project S.W.A.R.M.,1999,Acclaim,Acclaim,"NA, PAL",1—4,T/11+,Action/First-Person Shooter
Army Men: Air Combat,2000,3DO,3DO,NA,1—4,T/—,Action/Adventure/3D Shooter
Army Men: Sarge's Heroes,1999,3DO,3DO,"NA, PAL",1—4,T/11+,Action/Adventure/3D Shooter
Army Men: Sarge's Heroes 2,2000,3DO,3DO,NA,1—4,T/—,Action/Adventure/3D Shooter
Asteroids Hyper 64,1999,Syrox Developments,Crave Entertainment,NA,1—4,E/—,Arcade/Action/Shooter
Automobili Lamborghini•Super Speed Race 64JP,1997,Titus Software,Titus SoftwareTaito,"JP, NA, PAL",1—4,K—A/3+,Racing/Automobile
Bakuretsu Muteki Bangai-O,1999,Treasure,ESP,JP,1,—,Action/Adventure
Bakusho Jinsei 64: Mezase! Resort O,1998,Taito,Taito,JP,1—4,—,Board Game
Banjo-Kazooie•Banjo to Kazooie no DaibokenJP,1998,Rare,Nintendo,"JP, NA, PAL",1,E/3+,Adventure/3D Platformer
Banjo-Tooie•Banjo to Kazooie no Daiboken 2JP,2000,Rare,Nintendo,"JP, NA, PAL",1—4,E/3+,Adventure/3D Platformer
Bass Hunter 64,1999,Gear Head Entertainment,Take-Two Interactive,"NA, PAL",1,E/3+,Sports/Fishing
Bass Masters 2000,1999,Mass Media,THQ,NA,1—2,E/—,Sports/Fishing
Bass Rush: ECOGEAR PowerWorm Championship,2000,Visco Corporation,Visco Corporation,JP,1,—,Sports/Fishing
Batman Beyond: Return of the Joker•Batman of the Future: Return of the JokerPAL,2000,Kemco,Ubisoft,"NA, PAL",1,E/3+,Action/Adventure
BattleTanx,1998,3DO,3DO,NA,1—4,T/—,Simulation/Tank Combat
BattleTanx: Global Assault,1999,3DO,3DO,"NA, PAL",1—4,T/11+,Simulation/Tank Combat
Battlezone: Rise of the Black Dogs,2000,Climax Group,Crave Entertainment,NA,1—4,E/—,Simulation/Tank Combat
Beetle Adventure Racing!•As Aventuras do FuscaBRZ•HSV Adventure RacingAUS,1999,Paradigm Entertainment,Electronic Arts,"JP, NA, PAL",1—4,E/3+,Racing/
```

After I converted it to a consistent Format:

```
                                        ▣ all.csv ˅

"Go, Diego, Go!: Great Dinosaur Rescue", "October 27, 2008 ", N/A, N/A, Nintendo DS, Take-Two Interactive, Black Lantern Studios, N/A
Go West! A Lucky Luke Adventure, "November 20, 2007 ", N/A, N/A, Nintendo DS, Atari, Neko Entertainment, N/A
Godzilla Unleashed: Double Smash, "November 20, 2007 ", N/A, N/A, Nintendo DS, Atari, Santa Cruz Games, N/A
Golden Balls, 2008, N/A, N/A, Nintendo DS, Mindscape, Mindscape, N/A
The Golden Compass, "November 30, 2007 ", N/A, N/A, Nintendo DS, Sega, Artificial Mind and Movement, N/A
Golden Nugget Casino DS, "December 15, 2005 ", N/A, N/A, Nintendo DS, Majesco Entertainment, SkyRiver Studios, N/A
Golden Sun: Dark Dawn, 2010 , N/A, N/A, Nintendo DS, Nintendo, Camelot Software Planning, N/A
GoldenEye: Rogue Agent, "June 13, 2005 ", N/A, N/A, Nintendo DS, EA Games, "EA Tiburon, n-Space", N/A
Golgo 13: File G-13 o Oe, 2009, N/A, N/A, Nintendo DS, Marvelous Interactive, Marvelous Interactive, N/A
Goosebumps HorrorLand, "October 14, 2008 ", N/A, N/A, Nintendo DS, Scholastic Corporation, Scholastic Corporation, N/A
GoPets: Vacation Island, "March 18, 2008 ", N/A, N/A, Nintendo DS, Konami, 1st Playable Productions, N/A
Gotouchi Kentei DS, 2006, N/A, N/A, Nintendo DS, Spike, Studio Zan, N/A
Gourmet Chef, "June 24, 2008 ", N/A, N/A, Nintendo DS, Ubisoft, Ubisoft, N/A
Grand Theft Auto: Chinatown Wars, "March 17, 2009 ", N/A, N/A, Nintendo DS, "Rockstar Games, CyberFront", Rockstar Leeds, N/A
Gravity Zero Racing, "October 10, 2008 ", N/A, N/A, Nintendo DS, , , N/A
Green Lantern: Rise of the Manhunters, 2011, N/A, N/A, Nintendo DS, Warner Bros. Interactive Entertainment, Griptonite Games, N/A
Greg Hastings Tournament Paintball MAX'D, "January 31, 2006 ", N/A, N/A, Nintendo DS, Activision, The Whole Experience, N/A
Grey's Anatomy: The Video Game, 2009, N/A, N/A, Nintendo DS, Ubisoft, Longtail Studios, N/A
Guilty Gear Dust Strikers, "April 25, 2006 ", N/A, N/A, Nintendo DS, "ASNetworks, Majesco Entertainment, THQ", Arc System Works, N/A
Guinness World Records: The Video Game, "October 24, 2008 ", N/A, N/A, Nintendo DS, Warner Bros. Interactive Entertainment, Warner Bros.
Interactive Entertainment, N/A
Guitar Hero: On Tour, "June 22, 2008 ", N/A, N/A, Nintendo DS, Activision, Vicarious Visions, N/A
Guitar Hero: On Tour Decades, "November 14, 2008 ", N/A, N/A, Nintendo DS, Activision, Vicarious Visions, N/A
Guitar Hero: On Tour Modern Hits, "June 9, 2009 ", N/A, N/A, Nintendo DS, Activision, Vicarious Visions, N/A
```

Example Program Code to convert to one consistent CSV can be seen below (JAVA):

```java
package csvtodbcs434;

import java.io.BufferedWriter;
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileWriter;
import java.io.IOException;
import java.io.PrintWriter;
import java.util.Scanner;
import java.util.logging.Level;
import java.util.logging.Logger;
```

```java
public class CSVtoDBcs434 {

    static String FILENAME = "/Users/augustgate/Desktop/Project 4 Data 434/virtual boy.csv";

    public static void main(String[] args) {
        String Title = "";
        String Year = "";
        String Genre;
        String SecondaryGenre ;
        String Publisher ;
        String Developer ;
        String Rating ";
        String Platform ;
        File file = new File(FILENAME);
        try {
            Scanner inFile = new Scanner(file);
            String temp;
            FileWriter fw = new FileWriter("/Users/augustgate/Desktop/Project 4 Data
434/all.csv", true);
            BufferedWriter bw = new BufferedWriter(fw);
            PrintWriter out = new PrintWriter(bw);
            while (inFile.hasNextLine()) {
                Title = "";
                Year = "N/A";
                Genre = "N/A";
                SecondaryGenre = "N/A";
                Publisher = "N/A";
                Developer = "N/A";
                Rating = "N/A";
                Platform = "N/A";
                temp = inFile.nextLine();
                String[] tokens = temp.split(",(?=(?:[^\"]*\"[^\"]*\")*[^\"]*$)", -1);

                Title = tokens[0];
                Developer = tokens[3];
                Publisher = tokens[4];
                Year = tokens[6];
              if(Year.equalsIgnoreCase("")||Year.equalsIgnoreCase("n/a") ){
                  Year = "N/A";
                }else Year = Year.substring(0, 4);
               Rating = tokens[8];
                if(Rating.equals("-")){
                    Rating = "N/A";
              }else{
                  Rating = Rating.split("/")[0];}
```

```
            if(Year.equalsIgnoreCase("unreleased")){
            Year = tokens[8];
            }
            if(Year.equalsIgnoreCase("unreleased")){
            Year = tokens[3];
            }

        if (tokens[2].split(",").length == 1) {
            Genre = tokens[2];
          }
          if (tokens[2].split(",").length == 2) {
            Genre = tokens[1].split(",")[0].substring(0);
            SecondaryGenre = tokens[1].split(",")[1];
          }
           if (tokens[2].split(",").length >= 3) {
            Genre = tokens[1].split(",")[0].substring(0);
            SecondaryGenre = tokens[1].split(",")[1];
          }
        Platform = "Nintendo Virtual Boy";
        System.out.println(Title + ", " + Year + ", " + Genre + ", " + SecondaryGenre + ", "
                + "" + Platform + ", " + Publisher + ", " + Developer + ", " + Rating);
        }
        out.flush();
        out.close();

    } catch (FileNotFoundException ex) {
        Logger.getLogger(CSVtoDBcs434.class.getName()).log(Level.SEVERE, null, ex);
    } catch (IOException ex) {
        Logger.getLogger(CSVtoDBcs434.class.getName()).log(Level.SEVERE, null, ex);
    }

  }

}
```

Next, since the Data set was so large, I created a Java Program using prepared statements. I used JDBC driver plugin and used MYSQL server included with MAMP program.

Below are some examples of the code. I slightly altered each time for each INSERT statement. Insert Queries can be seen in **Bold**.

Example 1:

For Table Schema: create table developer(name varchar(100), address varchar(100), primary key (name));

```
public class CSVtoDBcs434 {
   public static void main(String[] args) {
      File file = new File("/Users/augustgate/Desktop/Project 4 Data 434/all.csv");
      try {
         Scanner csvIn = new Scanner(file);
         String temp;
         String developer;
         String publisher;
         String ratings = " N/A";
         Connection conn = null;

         try {
            String userName = "root";
            String password = "root";
            String url = "jdbc:mysql://localhost:3306/CS434";

            Class.forName("com.mysql.jdbc.Driver").newInstance();
            conn = DriverManager.getConnection(url, userName, password);

            System.out.println("Database connection established");
//Query//
         String query = " insert ignore into developer (name)"
      + " values (?)";

            PreparedStatement preparedStmt = conn.prepareStatement(query);

            csvIn.useDelimiter(",");
            while (csvIn.hasNextLine()) {
               temp = csvIn.nextLine();
               String[] tokens = temp.split(",(?=(?:[^\"]*\"[^\"]*\")*[^\"]*$)", -1);
               if (tokens.length > 7) {
                  ratings = tokens[7];
               };
               developer = tokens[6];
              developer = developer.trim();
               developer =  developer.replaceAll("^\"|\"$", "");
               publisher = tokens[5];
               publisher = publisher.trim();
               publisher = publisher.replaceAll("^\"|\"$", "");
               String system = tokens[4];
               String title = tokens[0];
```

```
// create the mysql insert preparedstatement
            preparedStmt.setString(1, name);
// execute the preparedstatement
            preparedStmt.addBatch();
        }
        preparedStmt.executeBatch();
    } catch (Exception e) {
        System.err.println("Database Connection Failed");
        e.printStackTrace();
    }
    } catch (FileNotFoundException ex) {
        Logger.getLogger(CSVtoDBcs434.class.getName()).log(Level.SEVERE, null, ex);
    }
  }

}
```

Example 2:

For table schema: create table videogame(title varchar (100), dateReleased varchar (30), genre varchar (25), secondaryGenre varchar (25), developerName varchar (100), publisherName varchar (100),check(dateReleased >= 1970 and dateRelease <=2018), primary key(title,dateReleased), foreign key(developerName)references developer(name))
foreign key(publisherName)references publisher(name));

```
public class CSVtoDBcs434 {

  //static String FILENAME = "/Users/augustgate/Desktop/Project 4 Data 434/xboxone.csv";
  public static void main(String[] args) {
    File file = new File("/Users/augustgate/Desktop/Project 4 Data 434/all.csv");
    try {
        Scanner csvIn = new Scanner(file);
        String temp;
        String developer;
        String publisher;
        String ratings = " N/A";
        Connection conn = null;

        try {
            String userName = "root";
            String password = "root";
            String url = "jdbc:mysql://localhost:3306/CS434";

            Class.forName("com.mysql.jdbc.Driver").newInstance();
            conn = DriverManager.getConnection(url, userName, password);

            System.out.println("Database connection established");

            String query = " insert ignore into videogame (title, dateReleased, genre, secondaryGenre,
developerName , publisherName)"
    + " values (?, ?, ?, ?, ?,?)";
```

```
PreparedStatement preparedStmt = conn.prepareStatement(query);

        csvIn.useDelimiter(",");
        while (csvIn.hasNextLine()) {
           temp = csvIn.nextLine();
           String[] tokens = temp.split(",(?=(?:[^\"]*\"[^\"]*\")*[^\"]*$)", -1);
           if (tokens.length > 7) {
              ratings = tokens[7];
           };
           developer = tokens[6];
          developer = developer.trim();
          developer =  developer.replaceAll("^\"|\"$", "");
          publisher = tokens[5];
          publisher = publisher.trim();
          publisher = publisher.replaceAll("^\"|\"$", "");
          String system = tokens[4];
          String title = tokens[0];
        //   System.out.println(title + ", " + system);
          // create the mysql insert preparedstatement
          preparedStmt.setString(1, title);
          preparedStmt.setString (2, tokens[1]);  // date
          preparedStmt.setString(3, tokens[2]); // genre
//          preparedStmt.setString(4, tokens[3]); // secondary genre
//          preparedStmt.setString(5, developer); // developer company name
//          preparedStmt.setString(6, publisher); // publisher company name;
          // execute the preparedstatement
          preparedStmt.addBatch();
       }
      preparedStmt.executeBatch();
    } catch (Exception e) {
      System.err.println("Database Connection Failed");
      e.printStackTrace();
    }
  } catch (FileNotFoundException ex) {
    Logger.getLogger(CSVtoDBcs434.class.getName()).log(Level.SEVERE, null, ex);
  }
 }

}
```

 NOTE:
I slightly altered the code to fit the appropriate insert statements for each insert statement needed.

Screen shots of relations:

Simple select query showing header and some sample data (Couldn't get data to fit nicely on screen so columns are messed up in this screen shot/)

```
Database changed
mysql> select* from videogame;
+----------------------------------------------+---------------------------------+------------------------------
+----------------------------------+-------------------------------------------------+-----------------------------
+--------------------------------------------------+
| title                                                                         | dateReleased                    | genre
| secondaryGenre              | developerName                                       | publisherName
                                 |
+----------------------------------+-------------------------------------------------+-----------------------------
+--------------------------------------------------+
                                                    |
| Bakusou Dekotora Densetsu: Art Truck Battle                    | "June 25, 1998"                 |     N/A
|  N/A                        |                                                      | Human Entertainment
                                 |
| Bakusou Kyoudai Let's & Go!! Eternal Wings                     | "July 30, 1998"                 |     N/A
|  N/A                        | Jaleco Entertainment                                 | Jaleco Entertainment
                                 |
| Bakuten Shoot Beyblade 2002: Beybattle Tournament 2            | "August 1, 2002"                |     N/A
|  N/A                        | Takara                                               | Takara
                                 |
| Bakuten Shoot BeybladeJPBeyblade: Let it Rip!NA/PAL            | "December 5, 2001"              |     N/A
|  N/A                        | WAVEDGE                                              | Crave EntertainmentUS, AtariPAL, Takara
```

Screen shot of the join: **select playon.gametitle from playon, isGivenRatings where playon.platformName =' XBox' And isGivenRatings.ratingName = ' T';**

```
mysql> select playon.gametitle from playon, isGivenRatings where playon.platformName =' XBox' And isGivenRatings.ratingName = ' T';
+-----------------------------------------------------------------------------------+
| gametitle                                                                         |
+-----------------------------------------------------------------------------------+
| "Crouching Tiger, Hidden Dragon"                                                  |
| "Ed, Edd n Eddy: The Mis-Edventures"                                              |
| "SpongeBob SquarePants: Lights, Camera, Pants!"                                   |
| "The Chronicles of Narnia: The Lion, the Witch and the Wardrobe"                  |
| 007: Agent Under Fire                                                             |
| 007: Everything or Nothing                                                        |
| 007: From Russia with Love                                                        |
| 007: Nightfire                                                                    |
| 187 Ride or Die                                                                   |
| 2002 FIFA World Cup                                                               |
| 25 To Life                                                                        |
| 4x4 EVO 2                                                                         |
| 50 Cent: Bulletproof                                                              |
| Advent Rising                                                                     |
| AFL Live 2003                                                                     |
| AFL Live 2004                                                                     |
| AFL Live Premiership Edition                                                      |
| AFL Premiership 2005                                                              |
| Aggressive Inline                                                                 |
| Airforce Delta Storm  Deadly Skies (PAL)  Airforce Delta II (JP)                  |
| Alfa Romeo Racing Italiano  SCAR : Squadra Corse Alfa Romeo (PAL)                 |
| Alias                                                                             |
| Alien Hominid                                                                     |
| Aliens Versus Predator: Extinction                                                |
| All-Star Baseball 2003                                                            |
| All-Star Baseball 2004                                                            |
| All-Star Baseball 2005                                                            |
| Alter Echo                                                                        |
| America's Army: Rise of a Soldier                                                 |
| American Chopper                                                                  |
| American Chopper 2: Full Throttle                                                 |
| American McGee Presents: Scrapland                                                |
| AMF Bowling 2004                                                                  |
| AMF Xtreme Bowling 2006                                                           |
| Amped 2  Tenku 2 (JP)                                                             |
| Amped: Freestyle Snowboarding  Tenku: Freestyle Snowboarding (JP)                 |
| AND 1 Streetball                                                                  |
| Angelic Concert (JP)[1]                                                           |
```

Bottom of the above query showing the 100,000 plus of tuples:

```
| World Championship Pool 2004                                                     |
| World Championship Rugby                                                         |
| World Championship Snooker 2003                                                  |
| World Championship Snooker 2004                                                  |
| World Poker Tour                                                                 |
| World Racing                                                                     |
| World Racing 2                                                                   |
| World Series Baseball                                                            |
| World Series Baseball 2K3                                                        |
| World Series of Poker                                                            |
| World Snooker Championship 2005                                                  |
| World Soccer Winning Eleven 8 International  Pro Evolution Soccer 4 (PAL)  Winning Eleven 8 (JP) |
| World Soccer Winning Eleven 9  Pro Evolution Soccer 5 (PAL)  Winning Eleven 9 (JP) |
| World War II Combat: Iwo Jima                                                    |
| World War II Combat: Road to Berlin                                              |
| Worms 3D                                                                         |
| Worms 4: Mayhem                                                                  |
| Worms Forts: Under Siege                                                         |
| Wrath Unleashed                                                                  |
| Wreckless: The Yakuza Missions  Double-S.T.E.A.L. (JP)                           |
| WTA Tour Tennis                                                                  |
| WWE Raw 2                                                                        |
| WWE WrestleMania 21                                                              |
| WWF RAW                                                                          |
| X-Men Legends                                                                    |
| X-Men Legends II: Rise of Apocalypse                                            |
| X-Men: Next Dimension                                                            |
| X-Men: The Official Game                                                         |
| X2: Wolverine's Revenge                                                          |
| Xbox Live Arcade                                                                 |
| Xbox Live Video Chat                                                             |
| Xbox Music Mixer                                                                 |
| XGRA                                                                             |
| Xiaolin Showdown                                                                 |
| XIII                                                                             |
| Xyanide                                                                          |
| Yager                                                                            |
| Yetisports Arctic Adventure                                                      |
| Yonenaga Kunio no Shougi Seminar                                                 |
| Yourself!Fitness                                                                 |
| Yu-Gi-Oh! The Dawn of Destiny                                                    |
| Zapper: One Wicked Cricket                                                       |
| Zathura                                                                          |
| ZillerNet                                                                        |
| Æon Flux                                                                         |
+----------------------------------------------------------------------------------+
149904 rows in set (0.28 sec)
```

Screen shot of the join: **select distinct developedBy.gametitle, developedBy.developerName from developedBy,publishedBy where developerName = publisherName;**

```
| Sniper: Ghost Warrior                                        | City Interactive
| Sniper: Ghost Warrior 2                                      | City Interactive
| Everybody's Golf                                             | Clap Hanz
| Everybody's Golf 2                                           | Clap Hanz
| Everybody's Golf 6                                           | Clap Hanz
| Everybody's Golf Hot Shots Golf: Open Tee                    | Clap Hanz
| Everybody's Golf Portable 2 Hot Shots Golf: Open Tee 2       | Clap Hanz
| Hot Shots Golf 2                                             | Clap Hanz
| Hot Shots Golf 3                                             | Clap Hanz
| Hot Shots Golf Fore!                                         | Clap Hanz
| Hot Shots Golf: Out of Bounds•Everybody's Golf 5JP•Everybody's Golf: World TourEU | Clap Hanz
| Hot Shots Golf: World Invitational                           | Clap Hanz
| Hot Shots Tennis                                             | Clap Hanz
| Fortified                                                    | Clapfoot Games
| EarthNight                                                   | Cleaversoft
| When Vikings Attack                                          | Clever Beans
| When Vikings Attack!                                         | Clever Beans
| Ultimate Chicken Horse                                       | Clever Endeavour Games
```

```
| Cold Stone Creamery: Scoop It Up                             | Zoo Publishing
| Lagoon                                                       | Zoom Inc.
| Rurouni Kenshin: Meiji Kenkaku Romantan: Ishin Gekitōhen     | ZOOM Inc.
| Zero Divide                                                  | ZOOM Inc.
| Zero Divide 2: The Secret Wish•Zero Divide 2PAL              | ZOOM Inc.
| Zero Divide: The Final Conflict                              | ZOOM Inc.
| Panzer Elite Action: Fields of Glory                         | ZootFly
| Prison Break: The Conspiracy                                 | ZootFly
| Aqua Moto Racing 3D                                          | Zordix AB
| Aqua Moto Racing Utopia                                      | Zordix AB
| Snow Moto Racing Freedom                                     | Zordix AB
| Delicious 2 Deluxe                                           | Zylom Studios
| Delicious: Emily's Taste of Fame                             | Zylom Studios
| Delicious: Emily's Tea Garden                                | Zylom Studios
| Words with Friends                                           | Zynga
| Zynga Poker                                                  | Zynga
+---------------------------------------+----------------------+
21975 rows in set (0.77 sec)

mysql>
```

Very specific query where there is only a few tuples Example:

```
mysql> select distinct gametitle from playon where gameTitle like '%Halo%';
+---------------------------------+
| gametitle                       |
+---------------------------------+
| Eschalon: Book I                |
| Halo 2                          |
| Halo 2 Multiplayer Map Pack     |
| Halo 3                          |
| Halo 3: ODST                    |
| Halo 4                          |
| Halo 5: Guardians               |
| Halo Triple Pack                |
| Halo Wars                       |
| Halo Wars 2                     |
| Halo Wars: Definitive Edition   |
| Halo: Combat Evolved            |
| Halo: Combat Evolved Anniversary |
| Halo: Reach                     |
| Halo: Spartan Assault           |
| Halo: The Master Chief Collection |
+---------------------------------+
16 rows in set (0.06 sec)
```

Another query of '%Mario%' to show that this database has almost all video games in it.
Example:

```
mysql> select distinct gametitle from playon where gameTitle like '%Mario%';
+---------------------------------------------------------------------------------+
| gametitle                                                                       |
+---------------------------------------------------------------------------------+
| Dance Dance Revolution Mario Mix•Dancing Stage Mario MixPAL•Dance Dance Revolution with MarioJP |
| Dr. Mario                                                                       |
| Dr. Mario & Puzzle League                                                       |
| Dr. Mario 64                                                                    |
| Dr. Mario: Miracle Cure                                                         |
| Mario & Luigi Superstar Saga + Bowser's Minions•Mario & Luigi RPG1 DXJP         |
| Mario & Luigi: Bowser's Inside Story                                            |
| Mario & Luigi: Dream Team•Mario & Luigi RPG 4: Dream AdventureJP•Mario & Luigi: Dream Team Bros.PAL |
| Mario & Luigi: Paper Jam•Mario & Luigi RPG Paper Mario MixJP•Mario & Luigi: Paper Jam Bros.PAL |
| Mario & Luigi: Partners in Time                                                 |
| Mario & Luigi: Superstar Saga                                                   |
| Mario & Sonic at the London 2012 Olympic Games                                  |
| Mario & Sonic at the London 2012 Olympic Games•Mario & Sonic at London OlympicsJP |
| Mario & Sonic at the Olympic Games                                              |
| Mario & Sonic at the Olympic Winter Games                                       |
| Mario & Sonic at the Rio 2016 Olympic Games                                     |
| Mario & Sonic at the Rio 2016 Olympic Games•Mario & Sonic at Rio OlympicsJP     |
| Mario & Sonic at the Sochi 2014 Olympic Winter Games                            |
| Mario + Rabbids Kingdom Battle                                                  |
| Mario and Donkey Kong: Minis on the Move•Mario and Donkey Kong: Mini Mini CarnivalJP |
| Mario Andretti Racing                                                           |
| Mario Bros.                                                                     |
| Mario Clash[7]                                                                  |
| Mario Golf                                                                      |
| Mario Golf: Advance Tour                                                        |
| Mario Golf: Toadstool Tour                                                      |
| Mario Golf: World Tour                                                          |
| Mario Hoops 3-on-3                                                              |
| Mario is Missing                                                                |
```

```
| Sabre Marionette J: Battle Sabres                                               |
| Super Mario 3D Land                                                             |
| Super Mario 3D World                                                            |
| Super Mario 64                                                                  |
| Super Mario 64 DS                                                               |
| Super Mario Advance                                                             |
| Super Mario Advance 2                                                           |
| Super Mario Advance 3                                                           |
| Super Mario Advance 4                                                           |
| Super Mario All-Stars                                                           |
| Super Mario All-Stars + Super Mario World                                       |
| Super Mario Bros. Deluxe                                                        |
| Super Mario Galaxy                                                              |
| Super Mario Galaxy 2                                                            |
| Super Mario Kart                                                                |
| Super Mario Land                                                                |
| Super Mario Land 2: 6 Golden CoinsSuper Mario Land 2: 6 Tsu no Kinka JP         |
| Super Mario Maker                                                               |
| Super Mario Maker for Nintendo 3DS                                              |
| Super Mario Odyssey                                                             |
| Super Mario RPG: Legend of the Seven Stars                                      |
| Super Mario Run                                                                 |
| Super Mario Strikers•Mario Smash FootballPAL                                    |
| Super Mario Sunshine                                                            |
| Super Mario World                                                               |
| Super Mario World 2: Yoshi's Island                                             |
| Super Paper Mario                                                               |
| Tetris & Dr. Mario                                                              |
| Wario Land: Super Mario Land 3Super Mario Land 3: Wario Land JP                 |
| YoshiYoshi no Tamago JPMario & Yoshi EU                                         |
+---------------------------------------------------------------------------------+
125 rows in set (0.07 sec)
```

Some final shots to demonstrate that some more relations:

```
mysql> select distinct playon.gameTitle, playon.platformName, videogame.genre from playon, videogame where videogame.genre = ' Action' AND playon.platformName = ' Sony Play
ion 3'
    -> ;
+----------------------------------------------------------------------------------------------------+-------------------+----------+
| gameTitle                                                                                          | platformName      | genre    |
+----------------------------------------------------------------------------------------------------+-------------------+----------+
| "Best of Arcade Games (Air Hockey, Brick Breaker, Bubble Buster, Tetraminos)"                      | Sony Playstation 3 | Action |
| "Best of Board Games (Chess, Mahjong, Solitaire)"                                                  | Sony Playstation 3 | Action |
| "Capcom Arcade Cabinet (1942, 1943, 1943 Kai, Avengers, Black Tiger, Commando, Exed Exes, Ghosts 'n | Sony Playstation 3 | Action |
| "Dungeons & Dragons: Chronicles of Mystara (Dungeons & Dragons: Shadow over Mystara, Dungeons & Drag | Sony Playstation 3 | Action |
| "Final Fight: Double Impact (Final Fight                                                            | Sony Playstation 3 | Action |
| "Lights, Camera, Party!"                                                                            | Sony Playstation 3 | Action |
| "Marvel vs. Capcom Origins (Marvel Super Heroes, Marvel vs. Capcom: Clash of Super Heroes)"         | Sony Playstation 3 | Action |
| "Mortal Kombat Arcade Kollection (Mortal Kombat, Mortal Kombat II, Ultimate Mortal Kombat 3)"       | Sony Playstation 3 | Action |
| "Namco Museum Essentials (Dig Dug, Dragon Spirit, Galaga, Pac-Man, Xevious, Xevious Resurrection)[94 | Sony Playstation 3 | Action |
| "Pac-Man Museum (Ms. Pac-Man, Pac & Pal, Pac-Attack, Pac-Land, Pac-Man, Pac-Man Arrangement, Pac-Man | Sony Playstation 3 | Action |
| "Sharin no Kuni, Himawari no Shoujo"                                                                | Sony Playstation 3 | Action |
| "Spelunker Collection (Spelunker Classic, Spelunker Console, Spelunker Arcade, Spelunker II)"       | Sony Playstation 3 | Action |
| "Tacchi, Shiyo! Love Application"                                                                   | Sony Playstation 3 | Action |
| "Taiheiyou no Arashi: Senkan Yamato, Akatsuki ni Shutsugekisu"                                      | Sony Playstation 3 | Action |
| "The Jackbox Party Pack (Drawful, Fibbage XL, Lie Swatter, Word Spud, You Don't Know Jack 2015)"    | Sony Playstation 3 | Action |
| "The Jackbox Party Pack 2 (Bidiots, Bomb Corp., Earwax, Fibbage 2, Quiplash XL)"                    | Sony Playstation 3 | Action |
| "Tri-polar Princess ~ Ransei, Tenshi of the heavens ~"                                              | Sony Playstation 3 | Action |
| "Warhammer 40,000: Kill Team"                                                                       | Sony Playstation 3 | Action |
| "Warhammer 40,000: Space Marine"                                                                    | Sony Playstation 3 | Action |
| #killallzombies                                                                                    | Sony Playstation 3 | Action |
| &: Sora no Mukō de Saki Masuyō ni                                                                   | Sony Playstation 3 | Action |
| .detuned[1]                                                                                         | Sony Playstation 3 | Action |
| .hack//Versus                                                                                       | Sony Playstation 3 | Action |
| 007 Legends                                                                                         | Sony Playstation 3 | Action |
| 007: Quantum of Solace                                                                              | Sony Playstation 3 | Action |
| 1942: Joint Strike[2]                                                                               | Sony Playstation 3 | Action |
| 2010 FIFA World Cup South Africa                                                                    | Sony Playstation 3 | Action |
| 2014 FIFA World Cup Brazil                                                                          | Sony Playstation 3 | Action |
| 2nd Super Robot Wars Original Generation                                                            | Sony Playstation 3 | Action |
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| Eat Lead: The Return of Matt Hazard                | Sony Playstation 3 | Action |
| Eat Them!                                          | Sony Playstation 3 | Action |
| Echochrome II                                      | Sony Playstation 3 | Action |
| Echochrome[44]                                     | Sony Playstation 3 | Action |
| Eiyuu Senhime                                      | Sony Playstation 3 | Action |
| El Chavo Kart                                      | Sony Playstation 3 | Action |
| El Shaddai: Ascension of the Metatron              | Sony Playstation 3 | Action |
| Elefunk[46]                                        | Sony Playstation 3 | Action |
| Elemental Monster: Online Card Game                | Sony Playstation 3 | Action |
| Elevator Action Deluxe                             | Sony Playstation 3 | Action |
| Enchanted Arms                                     | Sony Playstation 3 | Action |
| Enemy Front                                        | Sony Playstation 3 | Action |
| Enemy Territory: Quake Wars                        | Sony Playstation 3 | Action |
| Enslaved: Odyssey to the West                      | Sony Playstation 3 | Action |
| Entwined                                           | Sony Playstation 3 | Action |
| Epic Mickey 2: The Power of Two                    | Sony Playstation 3 | Action |
| Escape Dead Island                                 | Sony Playstation 3 | Action |
| Eternal Sonata                                     | Sony Playstation 3 | Action |
| Ethan: Meteor Hunter                               | Sony Playstation 3 | Action |
| Eufloria                                           | Sony Playstation 3 | Action |
| Eureka Seven AO: Jungfrau no Hanabanatachi         | Sony Playstation 3 | Action |
| Everybody Dance                                    | Sony Playstation 3 | Action |
| Everybody Dance 2                                  | Sony Playstation 3 | Action |
| Everybody Sing                                     | Sony Playstation 3 | Action |
| Everyday Shooter[47]                               | Sony Playstation 3 | Action |
| Explodemon[48]                                     | Sony Playstation 3 | Action |
| Extreme Exorcism                                   | Sony Playstation 3 | Action |
| EyeCreate                                          | Sony Playstation 3 | Action |
| EyePet                                             | Sony Playstation 3 | Action |
| Eyepet & Friends                                   | Sony Playstation 3 | Action |
| F.E.A.R.                                           | Sony Playstation 3 | Action |
| F.E.A.R. 2: Project Origin                         | Sony Playstation 3 | Action |
| F.E.A.R. 3                                         | Sony Playstation 3 | Action |
| F1 2010                                            | Sony Playstation 3 | Action |
| F1 2011                                            | Sony Playstation 3 | Action |
| F1 Race Stars                                      | Sony Playstation 3 | Action |
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| Top Trumps Turbo                               | Sony Playstation 3 | Action |
| Topatoi[148]                                   | Sony Playstation 3 | Action |
| Tornado Outbreak                               | Sony Playstation 3 | Action |
| Toro to Morimori                               | Sony Playstation 3 | Action |
| Toukiden 2                                     | Sony Playstation 3 | Action |
| Tower of Guns                                  | Sony Playstation 3 | Action |
| Toy Home[149]                                  | Sony Playstation 3 | Action |
| Toy Story 3: The Video Game                    | Sony Playstation 3 | Action |
| Toy Story Mania                                | Sony Playstation 3 | Action |
| Toybox Turbos                                  | Sony Playstation 3 | Action |
| Transformers: Dark of the Moon                 | Sony Playstation 3 | Action |
| Transformers: Devastation                      | Sony Playstation 3 | Action |
| Transformers: Fall of Cybertron                | Sony Playstation 3 | Action |
| Transformers: Revenge of the Fallen            | Sony Playstation 3 | Action |
| Transformers: Rise of the Dark Spark           | Sony Playstation 3 | Action |
| Transformers: The Game                         | Sony Playstation 3 | Action |
| Transformers: War for Cybertron                | Sony Playstation 3 | Action |
| Trash Panic[150]                               | Sony Playstation 3 | Action |
| Treasures of Montezuma: Arena                  | Sony Playstation 3 | Action |
| Trine 2                                        | Sony Playstation 3 | Action |
| Trine[151]                                     | Sony Playstation 3 | Action |
| Trinity Universe                               | Sony Playstation 3 | Action |
| Trinity: Souls of Zill O'll                    | Sony Playstation 3 | Action |
| Trivial Pursuit                                | Sony Playstation 3 | Action |
| Trivial Pursuit Live!                          | Sony Playstation 3 | Action |
| Tron: Evolution                                | Sony Playstation 3 | Action |
| Truck Racer                                    | Sony Playstation 3 | Action |
| Tsumiki BLOQ                                   | Sony Playstation 3 | Action |
| Tumble                                         | Sony Playstation 3 | Action |
| Turbo: Super Stunt Squad'                      | Sony Playstation 3 | Action |
| Turning Point: Fall of Liberty                 | Sony Playstation 3 | Action |
| Turok                                          | Sony Playstation 3 | Action |
| TV Anime Idolm@ster Cinderella G4U!            | Sony Playstation 3 | Action |
| TV Show King                                   | Sony Playstation 3 | Action |
| TV Superstars                                  | Sony Playstation 3 | Action |
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| WWE 13                                         | Sony Playstation 3 | Action |
| X-Blades                                       | Sony Playstation 3 | Action |
| X-Factor                                       | Sony Playstation 3 | Action |
| X-Men                                          | Sony Playstation 3 | Action |
| X-Men Origins: Wolverine                       | Sony Playstation 3 | Action |
| X-Men: Destiny                                 | Sony Playstation 3 | Action |
| XBLAZE Code: Embryo                            | Sony Playstation 3 | Action |
| XBlaze Lost: Memories                          | Sony Playstation 3 | Action |
| XCOM: Enemy Unknown                            | Sony Playstation 3 | Action |
| XCOM: Enemy Within                             | Sony Playstation 3 | Action |
| Yaiba: Ninja Gaiden Z                          | Sony Playstation 3 | Action |
| Yakuza 3                                       | Sony Playstation 3 | Action |
| Yakuza 4                                       | Sony Playstation 3 | Action |
| Yakuza: Dead Souls                             | Sony Playstation 3 | Action |
| Yamasa Digiworld SP Pachislo Bounty Killer     | Sony Playstation 3 | Action |
| Yamasa Digiworld SP Pachislo Sengoku Musou     | Sony Playstation 3 | Action |
| Yoostar 2: In the Movies                       | Sony Playstation 3 | Action |
| Yorunonaikuni                                  | Sony Playstation 3 | Action |
| You Don't Know Jack                            | Sony Playstation 3 | Action |
| Young Justice: Legacy                          | Sony Playstation 3 | Action |
| Yu-Gi-Oh! 5D's: Decade Duels Plus              | Sony Playstation 3 | Action |
| Yu-Gi-Oh! Millennium Duels                     | Sony Playstation 3 | Action |
| Yummy Circus                                   | Sony Playstation 3 | Action |
| Z/X - Crusade of the Absolute Boundary         | Sony Playstation 3 | Action |
| Zack Zero                                      | Sony Playstation 3 | Action |
| Zen Pinball 2                                  | Sony Playstation 3 | Action |
| Zen Pinball[162]                               | Sony Playstation 3 | Action |
| Zeno Clash II                                  | Sony Playstation 3 | Action |
| Zombeer                                        | Sony Playstation 3 | Action |
| Zombie Apocalypse                              | Sony Playstation 3 | Action |
| Zombie Apocalypse: Never Die Alone             | Sony Playstation 3 | Action |
| Zombie Driver HD                               | Sony Playstation 3 | Action |
| Zombie Tycoon II: Brainhov's Revenge           | Sony Playstation 3 | Action |
| Zone of the Enders: HD Collection              | Sony Playstation 3 | Action |
| Zuma [11]                                      | Sony Playstation 3 | Action |
| Zuma's Revenge!                                | Sony Playstation 3 | Action |
| Zumba Fitness - Join the Party                 | Sony Playstation 3 | Action |
+------------------------------------------------+--------------------+--------+
2175 rows in set (30.98 sec)
```

Relational Schema (Altered)

Since the real data I was using did not have specific creators or producer names I had change the schema slightly. Here is the altered schema below:

```
create table developer(name varchar(100), address varchar(100), primary key
(name));

create table publisher(name varchar(100), address varchar(100), primary key
(name));

create table platforms(systemName varchar(100), yearCreated varchar (5),
yearsActive int, primary key(systemName));

create table ratings(ratingName varchar(5), recommendedAges varchar(11),
primary key(ratingName));

create table videogame(title varchar (100), dateReleased varchar (30), genre
varchar (25), secondaryGenre varchar (25), developerName varchar (100),
publisherName varchar (100),check( dateReleased >= 1970 and dateRelease
<=2018), primary key(title,dateReleased), foreign
key(developerName)references developer(name))
foreign key(publisherName)references publisher(name));

create table playon(gameTitle varchar(100), gameYearReleased varchar(30),
platformName varchar(100), primary key(gameTitle,gameYearReleased,
platformName),
foreign key(gameTitle, gameYearReleased) references videogame(title,
dateReleased),
foreign key(platformName) references platforms(systemName)
);

create table isGivenRatings(gameTitle varchar(100), dateReleased varchar(30),
ratingName varchar(5) , primary key (gameTitle, dateReleased, ratingName),
foreign key(gameTitle, dateReleased) references  videogame(title,
dateReleased),
foreign key(ratingName) references ratings(ratingName)
 );

create table developedBy(gameTitle varchar(100), dateReleased varchar(30),
developerName varchar(100), creatorID int , primary key (gameTitle,
dateReleased, developerName),
foreign key(gameTitle, dateReleased) references  videogame(title,
dateReleased),
foreign key(developerName) references developer(name),
foreign key(creatorID) references employees(ID));

create table publishedBy(gameTitle varchar(100), dateReleased varchar(30),
publisherName varchar(100), execproducer int , primary key (gameTitle,
dateReleased, publisherName),
foreign key(gameTitle, dateReleased) references  videogame(title,
dateReleased),
foreign key(publisherName) references publisher(name),
foreign key(execproducer) references employees(ID)
 );
```