

# Project 2

CPSC 292 Section #02#

10/31/2025

## Project 1: Best-Selling Video Games of All Time

### Loading And Cleaning Data

```
game.data <- read.csv("game.data/best-selling video games of all time.csv")
game.data
```

| ##    | Rank | Title  | Sales     |
|-------|------|--|-----------|
| ## 1  | 1    | Minecraft  | 238000000 |
| ## 2  | 2    | Grand Theft Auto V                               | 175000000 |
| ## 3  | 3    | Tetris (EA)                                      | 100000000 |
| ## 4  | 4    | Wii Sports                                       | 82900000  |
| ## 5  | 5    | PUBG: Battlegrounds                              | 75000000  |
| ## 6  | 6    | Mario Kart 8 / Deluxe                            | 60460000  |
| ## 7  | 7    | Super Mario Bros.                                | 58000000  |
| ## 8  | 8    | Red Dead Redemption 2                            | 50000000  |
| ## 9  | 9    | Pokémon Red / Green / Blue / Yellow              | 47520000  |
| ## 10 | 10   | Terraria   | 44500000  |
| ## 11 | 11   | Wii Fit / Plus                                   | 43800000  |
| ## 12 | 12   | Tetris (1989)                                    | 43000000  |
| ## 13 | 13   | Pac-Man  | 42071635  |
| ## 14 | 14   | Animal Crossing: New Horizons                    | 41590000  |
| ## 15 | 15   | Human: Fall Flat                                 | 40000000  |
| ## 16 | 15   | The Witcher 3 / Hearts of Stone / Blood and Wine | 40000000  |
| ## 17 | 17   | Mario Kart Wii                                   | 37380000  |
| ## 18 | 18   | Wii Sports Resort                                | 33140000  |
| ## 19 | 19   | New Super Mario Bros.                            | 30800000  |
| ## 20 | 20   | The Legend of Zelda: Breath of the Wild          | 30700000  |
| ## 21 | 21   | Super Smash Bros. Ultimate                       | 30440000  |
| ## 22 | 22   | New Super Mario Bros. Wii                        | 30320000  |
| ## 23 | 23   | Call of Duty: Modern Warfare                     | 30000000  |
| ## 24 | 23   | Diablo III / Reaper of Souls                     | 30000000  |
| ## 25 | 23   | The Elder Scrolls V: Skyrim                      | 30000000  |
| ## 26 | 26   | Pokémon Gold / Silver / Crystal                  | 29490000  |
| ## 27 | 27   | Duck Hunt  | 28300000  |
| ## 28 | 28   | Wii Play   | 28020000  |
| ## 29 | 29   | The Walking Dead                                 | 28000000  |
| ## 30 | 30   | Grand Theft Auto: San Andreas                    | 27500000  |
| ## 31 | 31   | Super Mario World                                | 26662500  |
| ## 32 | 32   | Call of Duty: Modern Warfare 3                   | 26500000  |

|       |    |   |                                   |
|-------|----|---|-----------------------------------|
| ## 33 | 33 | Call of Duty: Black Ops                     | 26200000                          |
| ## 34 | 34 | Borderlands 2                               | 27000000                          |
| ## 35 | 35 | Pokémon Sword / Shield                      | 25680000                          |
| ## 36 | 36 | Pokémon Sun / Moon / Ultra Sun / Ultra Moon | 25410000                          |
| ## 37 | 37 | Super Mario Odyssey                         | 25120000                          |
| ## 38 | 38 | Grand Theft Auto IV                         | 25000000                          |
| ## 39 | 39 | Pokémon Diamond / Pearl / Platinum          | 24730000                          |
| ## 40 | 40 | Super Mario Bros. 3                         | 24430000                          |
| ## 41 | 41 | Call of Duty: Black Ops II                  | 24200000                          |
| ## 42 | 42 | FIFA 18                                     | 24000000                          |
| ## 43 | 42 | Kinect Adventures!                          | 24000000                          |
| ## 44 | 44 | Sonic the Hedgehog                          | 23982960                          |
| ## 45 | 45 | Nintendogs                                  | 23960000                          |
| ## 46 | 46 | New Super Mario Bros. U / Luigi U / Deluxe  | 23640000                          |
| ## 47 | 47 | Mario Kart DS                               | 23600000                          |
| ## 48 | 48 | Pokémon Ruby / Sapphire / Emerald           | 23280000                          |
| ## 49 | 49 | God of War                                  | 23000000                          |
| ## 50 | 49 | Red Dead Redemption                         | 23000000                          |
| ##    |    | Series                                      | Platform.s. Initial.release.date  |
| ## 1  |    | Minecraft                                   | Multi-platform November 18, 2011  |
| ## 2  |    | Grand Theft Auto                            | Multi-platform September 17, 2013 |
| ## 3  |    | Tetris                                      | Multi-platform September 12, 2006 |
| ## 4  |    | Wii   | Wii November 19, 2006             |
| ## 5  |    | PUBG Universe                               | Multi-platform December 20, 2017  |
| ## 6  |    | Mario Kart                                  | Wii U / Switch May 29, 2014       |
| ## 7  |    | Super Mario                                 | Multi-platform September 13, 1985 |
| ## 8  |    | Red Dead                                    | Multi-platform October 26, 2018   |
| ## 9  |    | Pokémon                                     | Multi-platform February 27, 1996  |
| ## 10 |    | None  | Multi-platform May 16, 2011       |
| ## 11 |    | Wii   | Wii December 1, 2007              |
| ## 12 |    | Tetris                                      | Game Boy / NES June 14, 1989      |
| ## 13 |    | Pac-Man                                     | Multi-platform May 22, 1980       |
| ## 14 |    | Animal Crossing                             | Nintendo Switch March 20, 2020    |
| ## 15 |    | None  | Multi-platform July 22, 2016      |
| ## 16 |    | The Witcher                                 | Multi-platform May 19, 2015       |
| ## 17 |    | Mario Kart                                  | Wii April 10, 2008                |
| ## 18 |    | Wii   | Wii June 25, 2009                 |
| ## 19 |    | Super Mario                                 | Nintendo DS May 15, 2006          |
| ## 20 |    | The Legend of Zelda                         | Wii U / Switch March 3, 2017      |
| ## 21 |    | Super Smash Bros.                           | Nintendo Switch December 7, 2018  |
| ## 22 |    | Super Mario                                 | Wii November 11, 2009             |
| ## 23 |    | Call of Duty                                | Multi-platform October 25, 2019   |
| ## 24 |    | Diablo                                      | Multi-platform May 16, 2012       |
| ## 25 |    | The Elder Scrolls                           | Multi-platform November 11, 2011  |
| ## 26 |    | Pokémon                                     | Game Boy Color November 21, 1999  |
| ## 27 |    | None  | NES April 21, 1984                |
| ## 28 |    | Wii   | Wii December 2, 2006              |
| ## 29 |    | The Walking Dead                            | Multi-platform April 24, 2012     |
| ## 30 |    | Grand Theft Auto                            | Multi-platform October 26, 2004   |
| ## 31 |    | Super Mario                                 | Multi-platform November 21, 1990  |
| ## 32 |    | Call of Duty                                | Multi-platform November 8, 2011   |
| ## 33 |    | Call of Duty                                | Multi-platform November 9, 2010   |
| ## 34 |    | Borderlands                                 | Multi-platform September 18, 2012 |
| ## 35 |    | Pokémon                                     | Nintendo Switch November 15, 2019 |

|       |                                  |                                |                    |
|-------|----------------------------------|--------------------------------|--------------------|
| ## 36 | Pokémon                          | Nintendo 3DS                   | November 18, 2016  |
| ## 37 | Super Mario                      | Nintendo Switch                | October 27, 2017   |
| ## 38 | Grand Theft Auto                 | Multi-platform                 | April 29, 2008     |
| ## 39 | Pokémon                          | Nintendo DS                    | September 28, 2006 |
| ## 40 | Super Mario                      | Multi-platform                 | October 23, 1988   |
| ## 41 | Call of Duty                     | Multi-platform                 | November 12, 2012  |
| ## 42 | FIFA                             | Multi-platform                 | September 29, 2017 |
| ## 43 | None                             | Xbox 360                       | November 4, 2010   |
| ## 44 | Sonic the Hedgehog               | Multi-platform                 | June 23, 1991      |
| ## 45 | None                             | Nintendo DS                    | April 21, 2005     |
| ## 46 | Super Mario                      | Wii U / Switch                 | November 18, 2012  |
| ## 47 | Mario Kart                       | Nintendo DS                    | November 14, 2005  |
| ## 48 | Pokémon                          | Game Boy Advance               | November 21, 2002  |
| ## 49 | God of War                       | PlayStation 4 / Windows        | April 20, 2018     |
| ## 50 | Red Dead                         | PS3 / Xbox 360                 | May 18, 2010       |
| ##    | Developer.s.                     | Publisher.s.                   |                    |
| ## 1  | Mojang Studios                   | Xbox Game Studios              |                    |
| ## 2  | Rockstar North                   | Rockstar Games                 |                    |
| ## 3  | EA Mobile                        | Electronic Arts                |                    |
| ## 4  | Nintendo EAD                     | Nintendo                       |                    |
| ## 5  | PUBG Corporation                 | PUBG Corporation               |                    |
| ## 6  | Nintendo EAD                     | Nintendo                       |                    |
| ## 7  | Nintendo R&D4                    | Nintendo                       |                    |
| ## 8  | Rockstar Studios                 | Rockstar Games                 |                    |
| ## 9  | Game Freak                       | Nintendo                       |                    |
| ## 10 | Re-Logic                         | Re-Logic / 505 Games           |                    |
| ## 11 | Nintendo EAD                     | Nintendo                       |                    |
| ## 12 | Nintendo R&D1                    | Nintendo                       |                    |
| ## 13 | Namco                            | Namco                          |                    |
| ## 14 | Nintendo EPD                     | Nintendo                       |                    |
| ## 15 | No Brakes Games                  | Curve Digital                  |                    |
| ## 16 | CD Projekt Red                   | CD Projekt                     |                    |
| ## 17 | Nintendo EAD                     | Nintendo                       |                    |
| ## 18 | Nintendo EAD                     | Nintendo                       |                    |
| ## 19 | Nintendo EAD                     | Nintendo                       |                    |
| ## 20 | Nintendo EPD                     | Nintendo                       |                    |
| ## 21 | Bandai Namco Studios / Sora Ltd. | Nintendo                       |                    |
| ## 22 | Nintendo EAD                     | Nintendo                       |                    |
| ## 23 | Infinity Ward                    | Activision                     |                    |
| ## 24 | Blizzard Entertainment           | Blizzard Entertainment         |                    |
| ## 25 | Bethesda Game Studios            | Bethesda Softworks             |                    |
| ## 26 | Game Freak                       | Nintendo                       |                    |
| ## 27 | Nintendo R&D1                    | Nintendo                       |                    |
| ## 28 | Nintendo EAD                     | Nintendo                       |                    |
| ## 29 | Telltale Games                   | Telltale Games                 |                    |
| ## 30 | Rockstar North                   | Rockstar Games                 |                    |
| ## 31 | Nintendo EAD                     | Nintendo                       |                    |
| ## 32 | Infinity Ward / Sledgehammer     | Activision                     |                    |
| ## 33 | Treyarch                         | Activision                     |                    |
| ## 34 | Gearbox Software                 | 2K Games                       |                    |
| ## 35 | Game Freak                       | Nintendo / The Pokémon Company |                    |
| ## 36 | Game Freak                       | Nintendo / The Pokémon Company |                    |
| ## 37 | Nintendo EPD                     | Nintendo                       |                    |
| ## 38 | Rockstar North                   | Rockstar Games                 |                    |

```
## 39          Game Freak Nintendo / The Pokémon Company
## 40          Nintendo EAD                               Nintendo
## 41          Treyarch                                  Activision
## 42          EA Vancouver                               EA Sports
## 43          Good Science Studio                       Xbox Game Studios
## 44          Sonic Team                                Sega
## 45          Nintendo EAD                               Nintendo
## 46          Nintendo EAD                               Nintendo
## 47          Nintendo EAD                               Nintendo
## 48          Game Freak Nintendo / The Pokémon Company
## 49          Santa Monica Studio Sony Interactive Entertainment
## 50          Rockstar San Diego                        Rockstar Games
```

```
game.data.clean <- game.data %>%
  clean_names() %>%
  remove_empty(which = c("rows", "cols")) %>%
  na.omit(game.data) %>%
  mutate(sales = sales / 100000)
game.data.clean
```

| ##    | rank | title  | sales     |
|-------|------|--|-----------|
| ## 1  | 1    | Minecraft  | 2380.0000 |
| ## 2  | 2    | Grand Theft Auto V                               | 1750.0000 |
| ## 3  | 3    | Tetris (EA)                                      | 1000.0000 |
| ## 4  | 4    | Wii Sports                                       | 829.0000  |
| ## 5  | 5    | PUBG: Battlegrounds                              | 750.0000  |
| ## 6  | 6    | Mario Kart 8 / Deluxe                            | 604.6000  |
| ## 7  | 7    | Super Mario Bros.                                | 580.0000  |
| ## 8  | 8    | Red Dead Redemption 2                            | 500.0000  |
| ## 9  | 9    | Pokémon Red / Green / Blue / Yellow              | 475.2000  |
| ## 10 | 10   | Terraria   | 445.0000  |
| ## 11 | 11   | Wii Fit / Plus                                   | 438.0000  |
| ## 12 | 12   | Tetris (1989)                                    | 430.0000  |
| ## 13 | 13   | Pac-Man  | 420.7163  |
| ## 14 | 14   | Animal Crossing: New Horizons                    | 415.9000  |
| ## 15 | 15   | Human: Fall Flat                                 | 400.0000  |
| ## 16 | 15   | The Witcher 3 / Hearts of Stone / Blood and Wine | 400.0000  |
| ## 17 | 17   | Mario Kart Wii                                   | 373.8000  |
| ## 18 | 18   | Wii Sports Resort                                | 331.4000  |
| ## 19 | 19   | New Super Mario Bros.                            | 308.0000  |
| ## 20 | 20   | The Legend of Zelda: Breath of the Wild          | 307.0000  |
| ## 21 | 21   | Super Smash Bros. Ultimate                       | 304.4000  |
| ## 22 | 22   | New Super Mario Bros. Wii                        | 303.2000  |
| ## 23 | 23   | Call of Duty: Modern Warfare                     | 300.0000  |
| ## 24 | 23   | Diablo III / Reaper of Souls                     | 300.0000  |
| ## 25 | 23   | The Elder Scrolls V: Skyrim                      | 300.0000  |
| ## 26 | 26   | Pokémon Gold / Silver / Crystal                  | 294.9000  |
| ## 27 | 27   | Duck Hunt  | 283.0000  |
| ## 28 | 28   | Wii Play   | 280.2000  |
| ## 29 | 29   | The Walking Dead                                 | 280.0000  |
| ## 30 | 30   | Grand Theft Auto: San Andreas                    | 275.0000  |
| ## 31 | 31   | Super Mario World                                | 266.6250  |
| ## 32 | 32   | Call of Duty: Modern Warfare 3                   | 265.0000  |
| ## 33 | 33   | Call of Duty: Black Ops                          | 262.0000  |

|       |                     |   |                      |
|-------|---------------------|---|----------------------|
| ## 34 | 34                  | Borderlands 2                               | 270.0000             |
| ## 35 | 35                  | Pokémon Sword / Shield                      | 256.8000             |
| ## 36 | 36                  | Pokémon Sun / Moon / Ultra Sun / Ultra Moon | 254.1000             |
| ## 37 | 37                  | Super Mario Odyssey                         | 251.2000             |
| ## 38 | 38                  | Grand Theft Auto IV                         | 250.0000             |
| ## 39 | 39                  | Pokémon Diamond / Pearl / Platinum          | 247.3000             |
| ## 40 | 40                  | Super Mario Bros. 3                         | 244.3000             |
| ## 41 | 41                  | Call of Duty: Black Ops II                  | 242.0000             |
| ## 42 | 42                  | FIFA 18                                     | 240.0000             |
| ## 43 | 42                  | Kinect Adventures!                          | 240.0000             |
| ## 44 | 44                  | Sonic the Hedgehog                          | 239.8296             |
| ## 45 | 45                  | Nintendogs                                  | 239.6000             |
| ## 46 | 46                  | New Super Mario Bros. U / Luigi U / Deluxe  | 236.4000             |
| ## 47 | 47                  | Mario Kart DS                               | 236.0000             |
| ## 48 | 48                  | Pokémon Ruby / Sapphire / Emerald           | 232.8000             |
| ## 49 | 49                  | God of War                                  | 230.0000             |
| ## 50 | 49                  | Red Dead Redemption                         | 230.0000             |
| ##    | series              | platform_s                                  | initial_release_date |
| ## 1  | Minecraft           | Multi-platform                              | November 18, 2011    |
| ## 2  | Grand Theft Auto    | Multi-platform                              | September 17, 2013   |
| ## 3  | Tetris              | Multi-platform                              | September 12, 2006   |
| ## 4  | Wii                 | Wii   | November 19, 2006    |
| ## 5  | PUBG Universe       | Multi-platform                              | December 20, 2017    |
| ## 6  | Mario Kart          | Wii U / Switch                              | May 29, 2014         |
| ## 7  | Super Mario         | Multi-platform                              | September 13, 1985   |
| ## 8  | Red Dead            | Multi-platform                              | October 26, 2018     |
| ## 9  | Pokémon             | Multi-platform                              | February 27, 1996    |
| ## 10 | None                | Multi-platform                              | May 16, 2011         |
| ## 11 | Wii                 | Wii   | December 1, 2007     |
| ## 12 | Tetris              | Game Boy / NES                              | June 14, 1989        |
| ## 13 | Pac-Man             | Multi-platform                              | May 22, 1980         |
| ## 14 | Animal Crossing     | Nintendo Switch                             | March 20, 2020       |
| ## 15 | None                | Multi-platform                              | July 22, 2016        |
| ## 16 | The Witcher         | Multi-platform                              | May 19, 2015         |
| ## 17 | Mario Kart          | Wii   | April 10, 2008       |
| ## 18 | Wii                 | Wii   | June 25, 2009        |
| ## 19 | Super Mario         | Nintendo DS                                 | May 15, 2006         |
| ## 20 | The Legend of Zelda | Wii U / Switch                              | March 3, 2017        |
| ## 21 | Super Smash Bros.   | Nintendo Switch                             | December 7, 2018     |
| ## 22 | Super Mario         | Wii   | November 11, 2009    |
| ## 23 | Call of Duty        | Multi-platform                              | October 25, 2019     |
| ## 24 | Diablo              | Multi-platform                              | May 16, 2012         |
| ## 25 | The Elder Scrolls   | Multi-platform                              | November 11, 2011    |
| ## 26 | Pokémon             | Game Boy Color                              | November 21, 1999    |
| ## 27 | None                | NES   | April 21, 1984       |
| ## 28 | Wii                 | Wii   | December 2, 2006     |
| ## 29 | The Walking Dead    | Multi-platform                              | April 24, 2012       |
| ## 30 | Grand Theft Auto    | Multi-platform                              | October 26, 2004     |
| ## 31 | Super Mario         | Multi-platform                              | November 21, 1990    |
| ## 32 | Call of Duty        | Multi-platform                              | November 8, 2011     |
| ## 33 | Call of Duty        | Multi-platform                              | November 9, 2010     |
| ## 34 | Borderlands         | Multi-platform                              | September 18, 2012   |
| ## 35 | Pokémon             | Nintendo Switch                             | November 15, 2019    |
| ## 36 | Pokémon             | Nintendo 3DS                                | November 18, 2016    |

|       |                                  |                                |                        |
|-------|----------------------------------|--------------------------------|------------------------|
| ## 37 | Super Mario                      | Nintendo Switch                | October 27, 2017       |
| ## 38 | Grand Theft Auto                 | Multi-platform                 | April 29, 2008         |
| ## 39 | Pokémon                          | Nintendo DS                    | September 28, 2006     |
| ## 40 | Super Mario                      | Multi-platform                 | October 23, 1988       |
| ## 41 | Call of Duty                     | Multi-platform                 | November 12, 2012      |
| ## 42 | FIFA                             | Multi-platform                 | September 29, 2017     |
| ## 43 | None                             | Xbox 360                       | November 4, 2010       |
| ## 44 | Sonic the Hedgehog               | Multi-platform                 | June 23, 1991          |
| ## 45 | None                             | Nintendo DS                    | April 21, 2005         |
| ## 46 | Super Mario                      | Wii U / Switch                 | November 18, 2012      |
| ## 47 | Mario Kart                       | Nintendo DS                    | November 14, 2005      |
| ## 48 | Pokémon                          | Game Boy Advance               | November 21, 2002      |
| ## 49 | God of War                       | PlayStation 4 / Windows        | April 20, 2018         |
| ## 50 | Red Dead                         | PS3 / Xbox 360                 | May 18, 2010           |
| ##    | developer_s                      |                                | publisher_s            |
| ## 1  | Mojang Studios                   |                                | Xbox Game Studios      |
| ## 2  | Rockstar North                   |                                | Rockstar Games         |
| ## 3  | EA Mobile                        |                                | Electronic Arts        |
| ## 4  | Nintendo EAD                     |                                | Nintendo               |
| ## 5  | PUBG Corporation                 |                                | PUBG Corporation       |
| ## 6  | Nintendo EAD                     |                                | Nintendo               |
| ## 7  | Nintendo R&D4                    |                                | Nintendo               |
| ## 8  | Rockstar Studios                 |                                | Rockstar Games         |
| ## 9  | Game Freak                       |                                | Nintendo               |
| ## 10 | Re-Logic                         |                                | Re-Logic / 505 Games   |
| ## 11 | Nintendo EAD                     |                                | Nintendo               |
| ## 12 | Nintendo R&D1                    |                                | Nintendo               |
| ## 13 | Namco                            |                                | Namco                  |
| ## 14 | Nintendo EPD                     |                                | Nintendo               |
| ## 15 | No Brakes Games                  |                                | Curve Digital          |
| ## 16 | CD Projekt Red                   |                                | CD Projekt             |
| ## 17 | Nintendo EAD                     |                                | Nintendo               |
| ## 18 | Nintendo EAD                     |                                | Nintendo               |
| ## 19 | Nintendo EAD                     |                                | Nintendo               |
| ## 20 | Nintendo EPD                     |                                | Nintendo               |
| ## 21 | Bandai Namco Studios / Sora Ltd. |                                | Nintendo               |
| ## 22 | Nintendo EAD                     |                                | Nintendo               |
| ## 23 | Infinity Ward                    |                                | Activision             |
| ## 24 | Blizzard Entertainment           |                                | Blizzard Entertainment |
| ## 25 | Bethesda Game Studios            |                                | Bethesda Softworks     |
| ## 26 | Game Freak                       |                                | Nintendo               |
| ## 27 | Nintendo R&D1                    |                                | Nintendo               |
| ## 28 | Nintendo EAD                     |                                | Nintendo               |
| ## 29 | Telltale Games                   |                                | Telltale Games         |
| ## 30 | Rockstar North                   |                                | Rockstar Games         |
| ## 31 | Nintendo EAD                     |                                | Nintendo               |
| ## 32 | Infinity Ward / Sledgehammer     |                                | Activision             |
| ## 33 | Treyarch                         |                                | Activision             |
| ## 34 | Gearbox Software                 |                                | 2K Games               |
| ## 35 | Game Freak                       | Nintendo / The Pokémon Company |                        |
| ## 36 | Game Freak                       | Nintendo / The Pokémon Company |                        |
| ## 37 | Nintendo EPD                     |                                | Nintendo               |
| ## 38 | Rockstar North                   |                                | Rockstar Games         |
| ## 39 | Game Freak                       | Nintendo / The Pokémon Company |                        |

```
## 40          Nintendo EAD          Nintendo
## 41          Treyarch            Activision
## 42          EA Vancouver        EA Sports
## 43      Good Science Studio      Xbox Game Studios
## 44          Sonic Team          Sega
## 45          Nintendo EAD        Nintendo
## 46          Nintendo EAD        Nintendo
## 47          Nintendo EAD        Nintendo
## 48          Game Freak Nintendo / The Pokémon Company
## 49      Santa Monica Studio Sony Interactive Entertainment
## 50          Rockstar San Diego    Rockstar Games
```

```
platforms <- sort(unique(game.data.clean$platform_s))
label_df <- data.frame(platform_s = platforms, median_sales = NA)
```

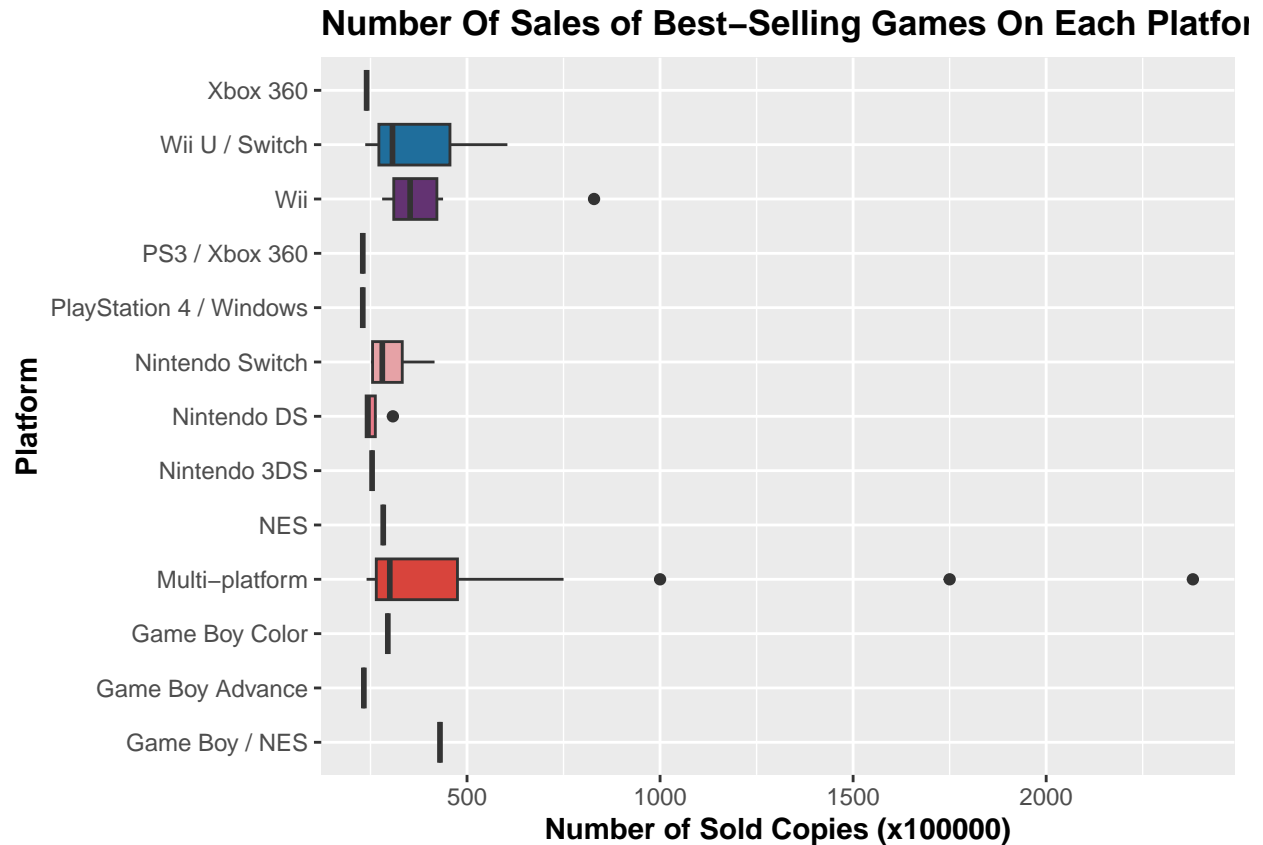
### Cleaning Steps Description:

This cleans the data names, removes any empty columns or rows, and omits any NA data.

## Visualizations

### Original Plot 1:

```
plot1 <- ggplot(game.data.clean) + geom_boxplot(aes(x = platform_s, y = sales, fill = platform_s)) + theme_minimal()
plot1
```

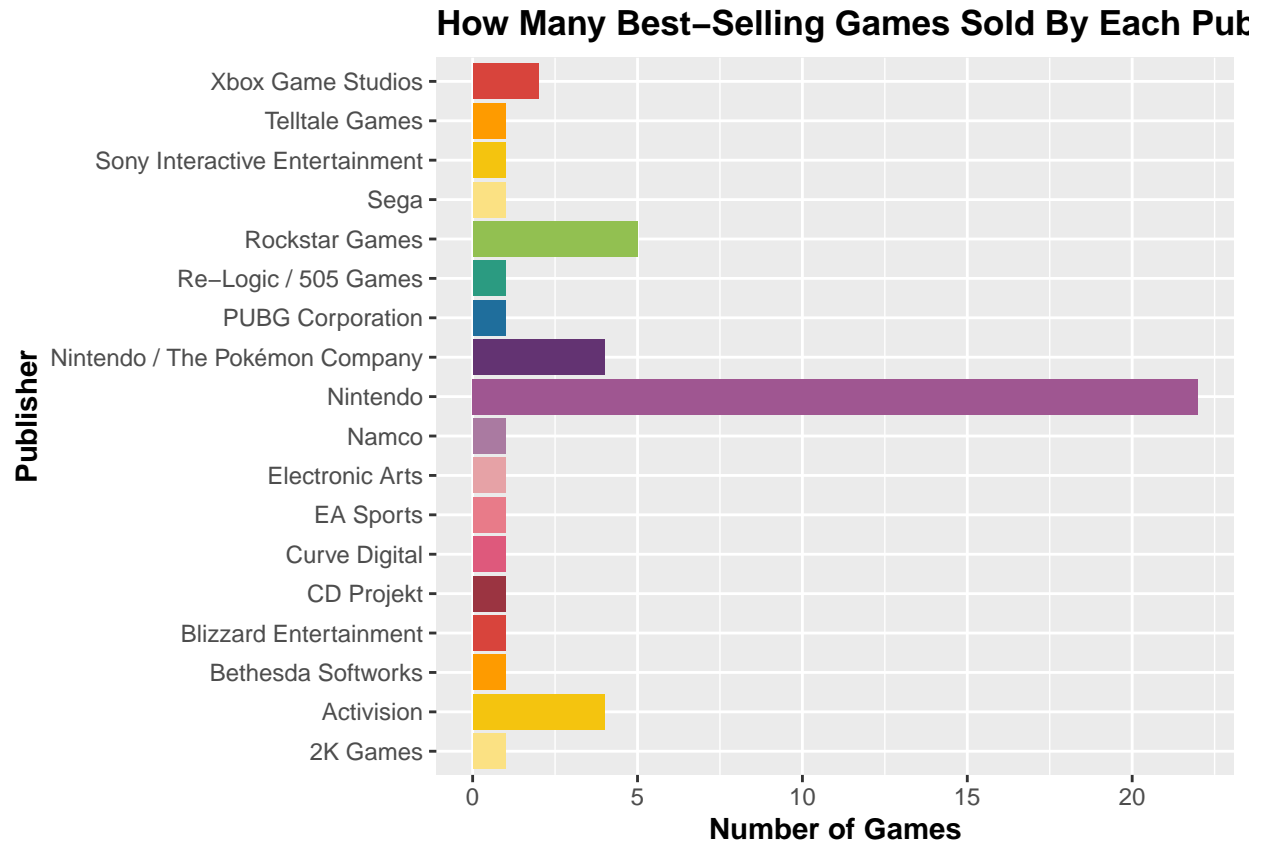


### Description of Plot 1: This plots shows us different platforms that the most sold video games of all time uses.

#### Original Plot 2:

```
color.base <- paletteer::paletteer_d("MetBrewer::Signac")
color <- rep(color.base, length.out = 18)
plot2 <- ggplot(game.data.clean) + geom_bar(aes(x = publisher_s, fill = publisher_s)) + theme(legend.position = "none")
plot2
```





### Description of Plot 2: These plots show us how many of the best selling video games of all time belong to each publisher.

#### Plot 1 with Function and Loop

```
make_plot <- function(data, x_var, y_var, geom_layer) {
  ggplot(data, aes_string(x = x_var, y = y_var, fill = x_var)) +
    geom_layer(width = 0.35) +
    theme(
      legend.position = "none",
      axis.title.x = element_text(face = "bold"),
      axis.title.y = element_text(face = "bold"),
      plot.title = element_text(face = "bold")
    ) +
    coord_flip()
}

plot1 <- make_plot(game.data.clean, "platform_s", "sales", geom_boxplot)
```

```
## Warning: 'aes_string()' was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with 'aes()'.
## i See also 'vignette("ggplot2-in-packages")' for more information.
## This warning is displayed once every 8 hours.
## Call 'lifecycle::last_lifecycle_warnings()' to see where this warning was
## generated.
```

```

plot1 <- plot1 +
  labs(title = "Number Of Sales of Best-Selling Games On Each Platform",
        x = "Platform",
        y = "Number of Sold Copies (x100000)") +
  scale_fill_paletteer_d("MetBrewer::Signac") +
  scale_x_discrete(expand = expansion(mult = c(0.05, 0.1)))

for (i in seq_along(platforms)) {
  p <- platforms[i]
  label_df$median_sales[i] <- median(
    game.data.clean$sales[game.data.clean$platform_s == p],
    na.rm = TRUE
  )
}

label_df

```

```

##           platform_s median_sales
## 1      Game Boy / NES      430.00
## 2    Game Boy Advance      232.80
## 3    Game Boy Color      294.90
## 4    Multi-platform      300.00
## 5              NES      283.00
## 6    Nintendo 3DS      254.10
## 7    Nintendo DS      243.45
## 8    Nintendo Switch      280.60
## 9 PlayStation 4 / Windows      230.00
## 10      PS3 / Xbox 360      230.00
## 11              Wii      352.60
## 12    Wii U / Switch      307.00
## 13      Xbox 360      240.00

```

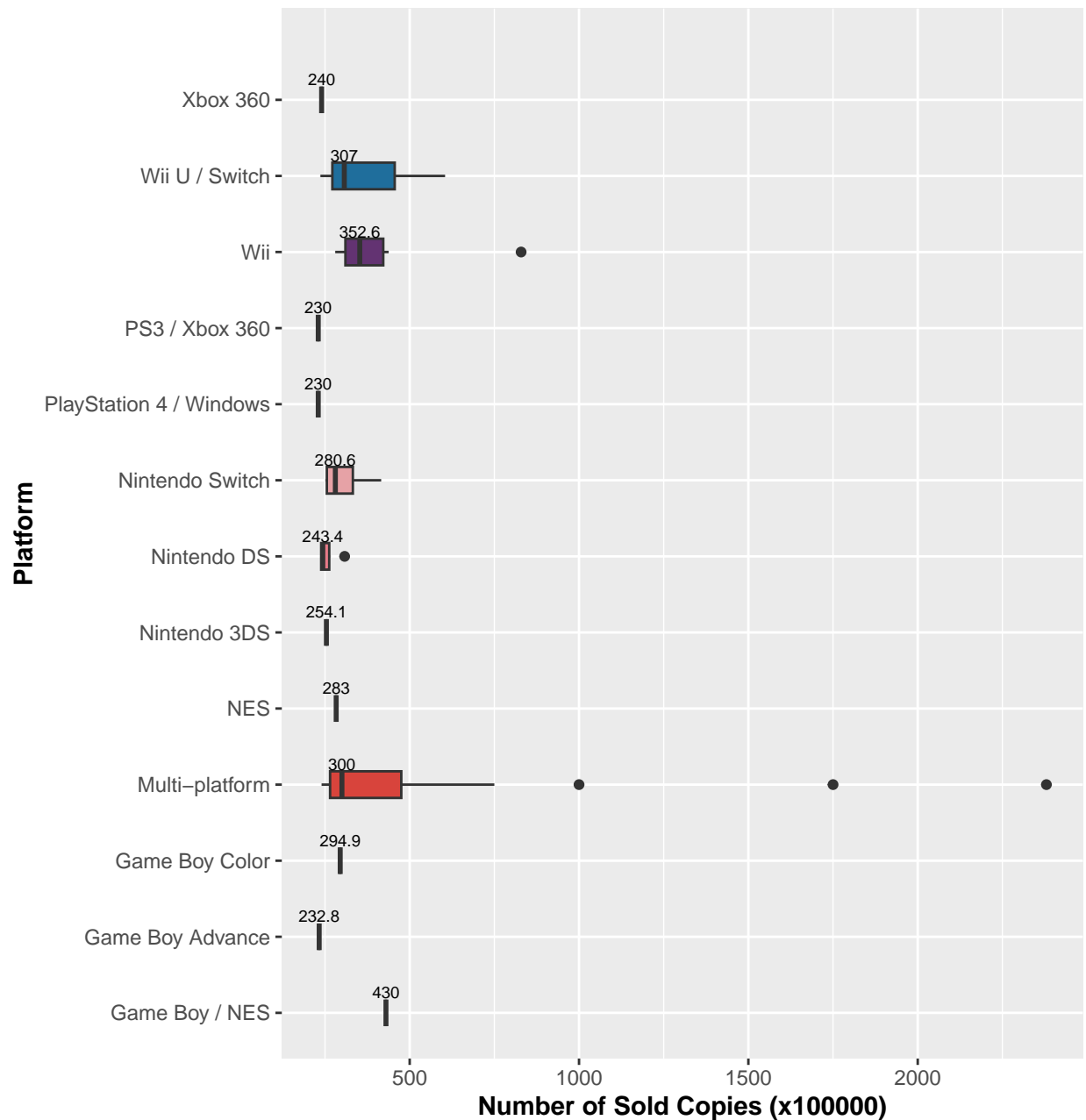
```

plot1_with_medians <- plot1 +
  geom_text(
    data = label_df,
    aes(x = platform_s,
        y = median_sales,
        label = round(median_sales, 1)),
    color = "black",
    size = 2.5,
    vjust = -1.25,
    hjust = 0.50
  )

plot1_with_medians

```

## Number Of Sales of Best-Selling Games On Each Platform



## Description of Plot 1 with Function and Loop This plot produces the same visualization as the original code. A “make\_plot” function was made to simplify the code and accept arguments including the data set, x variable, y variable, and geom layer style. A loop was used to create the median values of number of sold copies (x100000) for each platform, providing a better understanding of which kind of platforms get more sales based on their games.

### Plot 2 with Function and Conditional

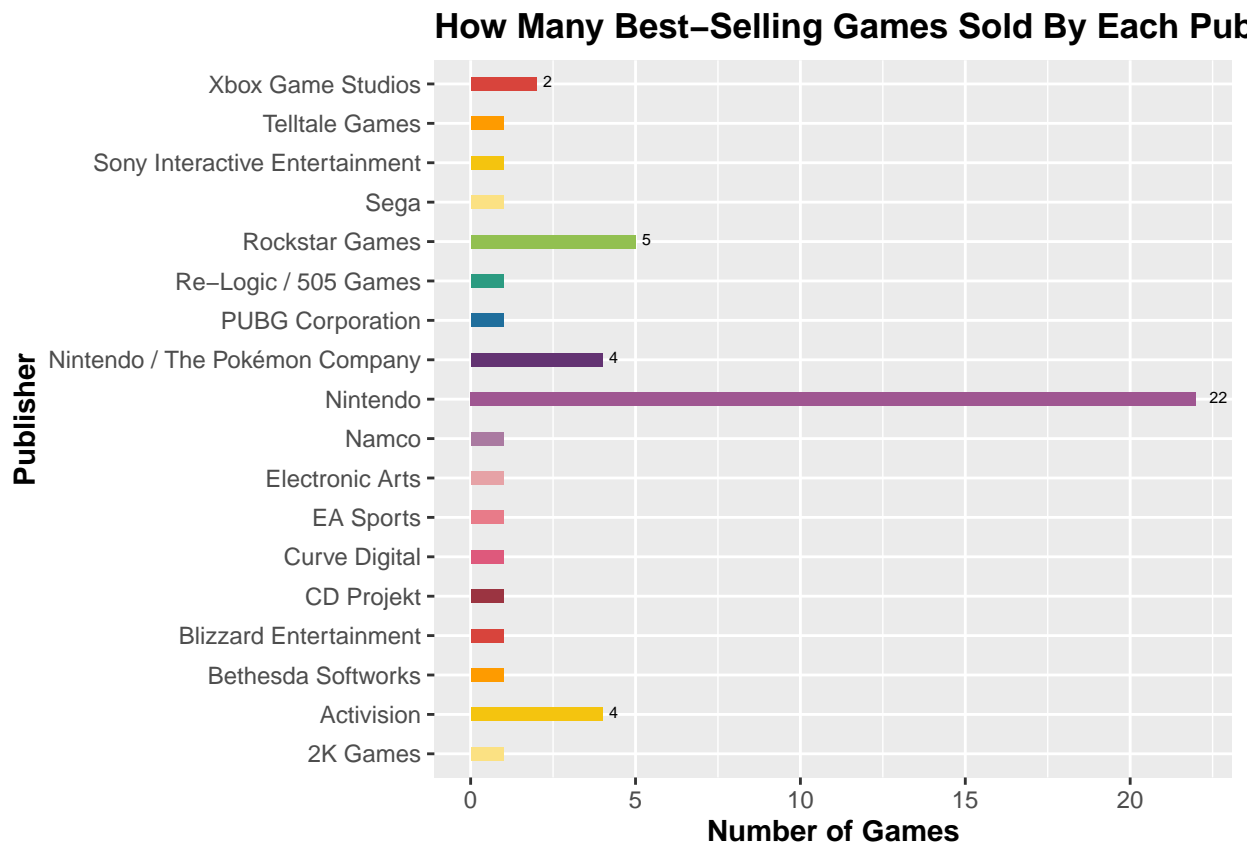
```
plot2 <- make_plot(game.data.clean, "publisher_s", geom_layer = geom_bar) +
  labs(
```

```

title = "How Many Best-Selling Games Sold By Each Publisher",
x = "Publisher",
y = "Number of Games",
fill = "Publisher"
) +
scale_fill_manual(values = color) +
geom_text(
  stat = "count",
  aes(label = ifelse(after_stat(count) > 1, after_stat(count), "")),
  vjust = 0.3,
  hjust = -0.75,
  size = 2
)

```

plot2



## Description of Plot 2 with Function and Conditional This plot produces the same visualization as the original code. The “make\_plot” function was used to create the visualization. A conditional was added to the geom text layer to include labels for the number of games sold by each publisher if the value was greater than 1. This feature adds an additional visual element that makes interpreting the data easier.

## References

<https://dplyr.tidyverse.org/> <https://ianadamsresearch.com/post/using-ggplot2-to-visualize-the-frequency-of-your-name/> <https://github.com/thomasp85/patchwork#patchwork> <https://www.sthda.com/english/>

wiki/bar-plots-r-base-graphs  
ggplot2-color.html

<https://exts.ggplot2.tidyverse.org/gallery/>

<https://r-graph-gallery.com/>