

Final Project: Looking at Marvel versus DC

Haley Marconi

December 7th, 2021

```
library(openintro)
```

```
## Loading required package: airports
```

```
## Loading required package: cherryblossom
```

```
## Loading required package: usdata
```

```
##
```

```
## Attaching package: 'openintro'
```

```
## The following object is masked from 'package:dslabs':
```

```
##
```

```
##      murders
```

```
mydata = read.csv("marvdc.csv")
```

```
mydata
```

| ## | | Original.Title | Company | Rate | Metascore | Minutes | Release |
|-------|-------------------------------------|----------------------------|---------|------|-----------|---------|---------|
| ## 1 | | Iron Man | Marvel | 7.9 | 79 | 126 | 2008 |
| ## 2 | | The Incredible Hulk | Marvel | 6.7 | 61 | 112 | 2008 |
| ## 3 | | Iron Man 2 | Marvel | 7.0 | 57 | 124 | 2010 |
| ## 4 | | Thor | Marvel | 7.0 | 57 | 115 | 2011 |
| ## 5 | Captain America: The First Avenger | | Marvel | 6.9 | 66 | 124 | 2011 |
| ## 6 | | The Avengers | Marvel | 8.0 | 69 | 143 | 2012 |
| ## 7 | | Iron Man Three | Marvel | 7.2 | 62 | 130 | 2013 |
| ## 8 | | Thor: The Dark World | Marvel | 6.9 | 54 | 112 | 2013 |
| ## 9 | Captain America: The Winter Soldier | | Marvel | 7.7 | 70 | 136 | 2014 |
| ## 10 | | Guardians of the Galaxy | Marvel | 8.0 | 76 | 121 | 2014 |
| ## 11 | | Avengers: Age of Ultron | Marvel | 7.3 | 66 | 141 | 2015 |
| ## 12 | | Ant-Man | Marvel | 7.3 | 64 | 117 | 2015 |
| ## 13 | | Captain America: Civil War | Marvel | 7.8 | 75 | 147 | 2016 |
| ## 14 | | Doctor Strange | Marvel | 7.5 | 72 | 115 | 2016 |
| ## 15 | Guardians of the Galaxy Vol. 2 | | Marvel | 7.6 | 67 | 136 | 2017 |
| ## 16 | | Spider-Man: Homecoming | Marvel | 7.4 | 73 | 133 | 2017 |
| ## 17 | | Thor: Ragnarok | Marvel | 7.9 | 74 | 130 | 2017 |
| ## 18 | | Black Panther | Marvel | 7.3 | 88 | 134 | 2018 |
| ## 19 | | Avengers: Infinity War | Marvel | 8.5 | 68 | 149 | 2018 |
| ## 20 | | Ant-Man and the Wasp | Marvel | 7.1 | 70 | 118 | 2018 |
| ## 21 | | Captain Marvel | Marvel | 6.9 | 64 | 123 | 2019 |
| ## 22 | | Avengers: Endgame | Marvel | 8.5 | 78 | 181 | 2019 |
| ## 23 | | Spider-Man: Far from Home | Marvel | 7.6 | 69 | 129 | 2019 |
| ## 24 | | Catwoman | DC | 3.3 | 27 | 104 | 2004 |
| ## 25 | | Batman Begins | DC | 8.2 | 70 | 140 | 2005 |
| ## 26 | | Superman Returns | DC | 6.0 | 72 | 154 | 2006 |

| | | | | | | |
|-------|------------------------------------|---------------------|-----------|-----------------|-----|------|
| ## 27 | The Dark Knight | DC | 9.0 | 84 | 152 | 2008 |
| ## 28 | Watchmen | DC | 7.6 | 56 | 162 | 2009 |
| ## 29 | Jonah Hex | DC | 4.7 | 33 | 81 | 2010 |
| ## 30 | Green Lantern | DC | 5.5 | 39 | 114 | 2011 |
| ## 31 | The Dark Knight Rises | DC | 8.4 | 78 | 164 | 2012 |
| ## 32 | Man of Steel | DC | 7.1 | 55 | 143 | 2013 |
| ## 33 | Batman v Superman: Dawn of Justice | DC | 6.5 | 44 | 151 | 2016 |
| ## 34 | Suicide Squad | DC | 6.0 | 40 | 123 | 2016 |
| ## 35 | Wonder Woman | DC | 7.4 | 76 | 141 | 2017 |
| ## 36 | Justice League | DC | 6.4 | 45 | 120 | 2017 |
| ## 37 | Aquaman | DC | 7.0 | 55 | 143 | 2018 |
| ## 38 | Shazam! | DC | 7.1 | 71 | 132 | 2019 |
| ## 39 | Joker | DC | 8.7 | 59 | 122 | 2019 |
| ## | Budget | Opening.Weekend.USA | Gross.USA | Gross.Worldwide | | |
| ## 1 | 140000000 | 98618668 | 318604126 | 585366247 | | |
| ## 2 | 150000000 | 55414050 | 134806913 | 263427551 | | |
| ## 3 | 200000000 | 128122480 | 312433331 | 623933331 | | |
| ## 4 | 150000000 | 65723338 | 181030624 | 449326618 | | |
| ## 5 | 140000000 | 65058524 | 176654505 | 370569774 | | |
| ## 6 | 220000000 | 207438708 | 623357910 | 1518812988 | | |
| ## 7 | 200000000 | 174144585 | 409013994 | 1214811252 | | |
| ## 8 | 170000000 | 85737841 | 206362140 | 644783140 | | |
| ## 9 | 170000000 | 95023721 | 259766572 | 714421503 | | |
| ## 10 | 170000000 | 94320883 | 333176600 | 772776600 | | |
| ## 11 | 250000000 | 191271109 | 459005868 | 1402805868 | | |
| ## 12 | 130000000 | 57225526 | 180202163 | 519311965 | | |
| ## 13 | 250000000 | 179139142 | 408084349 | 1153296293 | | |
| ## 14 | 165000000 | 85058311 | 232641920 | 677718395 | | |
| ## 15 | 200000000 | 146510104 | 389813101 | 863756051 | | |
| ## 16 | 175000000 | 117027503 | 334201140 | 880166924 | | |
| ## 17 | 180000000 | 122744989 | 315058289 | 853977126 | | |
| ## 18 | 200000000 | 202003951 | 700059566 | 1346913161 | | |
| ## 19 | 321000000 | 257698183 | 678815482 | 2048359754 | | |
| ## 20 | 162000000 | 75812205 | 216648740 | 622674139 | | |
| ## 21 | 175000000 | 153433423 | 426829839 | 1128274794 | | |
| ## 22 | 356000000 | 357115007 | 858373000 | 2797800564 | | |
| ## 23 | 160000000 | 92579212 | 390532085 | 1131927996 | | |
| ## 24 | 100000000 | 16728411 | 40202379 | 82102379 | | |
| ## 25 | 150000000 | 48745440 | 206852432 | 373413297 | | |
| ## 26 | 270000000 | 52535096 | 200081192 | 391081192 | | |
| ## 27 | 185000000 | 158411483 | 535234033 | 1004934033 | | |
| ## 28 | 130000000 | 55214334 | 107509799 | 185258983 | | |
| ## 29 | 47000000 | 5379365 | 10547117 | 10903312 | | |
| ## 30 | 200000000 | 53174303 | 116601172 | 219851172 | | |
| ## 31 | 250000000 | 160887295 | 448139099 | 1081041287 | | |
| ## 32 | 225000000 | 116619362 | 291045518 | 668045518 | | |
| ## 33 | 250000000 | 166007347 | 330360194 | 873634919 | | |
| ## 34 | 175000000 | 133682248 | 325100054 | 746846894 | | |
| ## 35 | 149000000 | 103251471 | 412563408 | 821847012 | | |
| ## 36 | 300000000 | 93842239 | 229024295 | 657924295 | | |
| ## 37 | 160000000 | 67873522 | 335061807 | 1148161807 | | |
| ## 38 | 100000000 | 53505326 | 140371656 | 364571656 | | |
| ## 39 | 55000000 | 96202337 | 333204580 | 1060504580 | | |

```

print(paste(nrow(mydata), "observations"))

## [1] "39 observations"

print(paste(ncol(mydata), "variables"))

## [1] "10 variables"

str(mydata)

## 'data.frame': 39 obs. of 10 variables:
## $ Original.Title : chr "Iron Man" "The Incredible Hulk" "Iron Man 2" "Thor" ...
## $ Company : chr "Marvel" "Marvel" "Marvel" "Marvel" ...
## $ Rate : num 7.9 6.7 7 7 6.9 8 7.2 6.9 7.7 8 ...
## $ Metascore : int 79 61 57 57 66 69 62 54 70 76 ...
## $ Minutes : int 126 112 124 115 124 143 130 112 136 121 ...
## $ Release : int 2008 2008 2010 2011 2011 2012 2013 2013 2014 2014 ...
## $ Budget : int 140000000 150000000 200000000 150000000 140000000 220000000 200000000 1
## $ Opening.Weekend.USA: int 98618668 55414050 128122480 65723338 65058524 207438708 174144585 85737
## $ Gross.USA : int 318604126 134806913 312433331 181030624 176654505 623357910 409013994 2
## $ Gross.Worldwide : num 5.85e+08 2.63e+08 6.24e+08 4.49e+08 3.71e+08 ...

marvonly <- mydata %>%
  filter(Company == 'Marvel')

marvonly

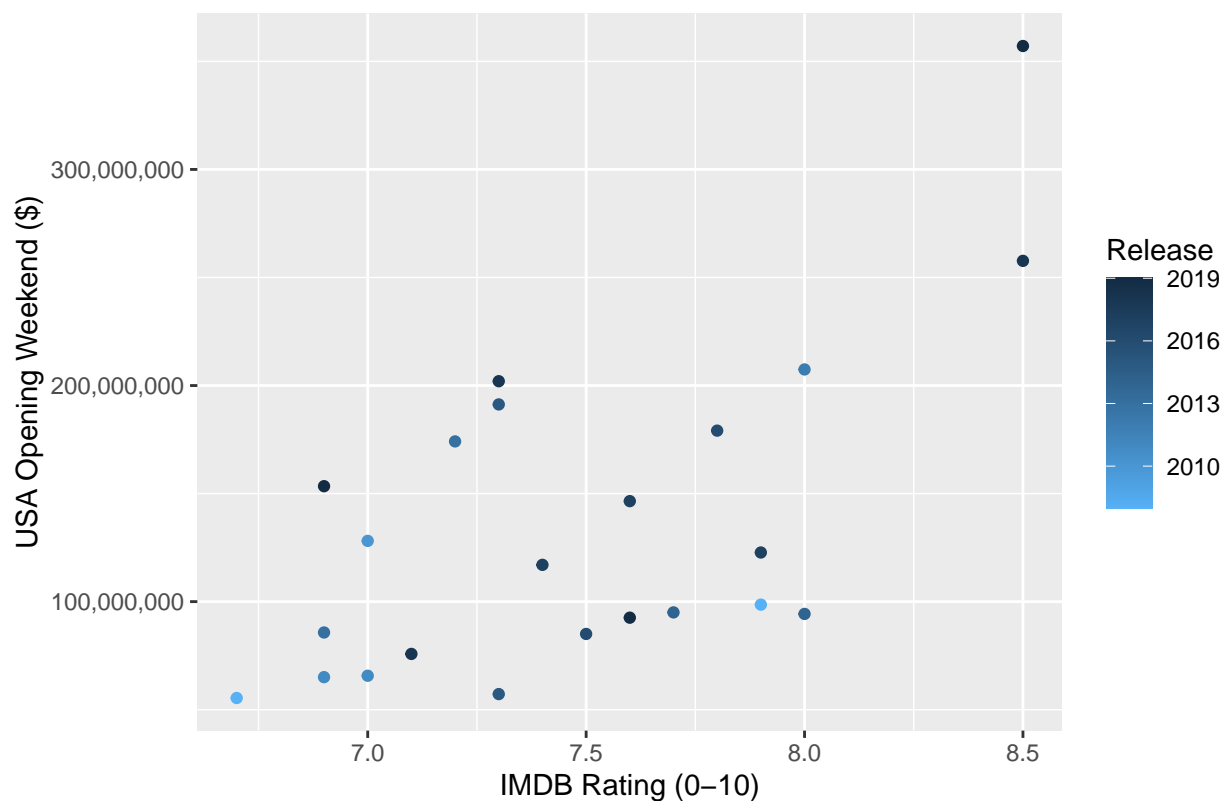
##           Original.Title Company Rate Metascore Minutes Release
## 1           Iron Man    Marvel  7.9         79      126    2008
## 2   The Incredible Hulk    Marvel  6.7         61      112    2008
## 3           Iron Man 2    Marvel  7.0         57      124    2010
## 4              Thor    Marvel  7.0         57      115    2011
## 5 Captain America: The First Avenger    Marvel  6.9         66      124    2011
## 6           The Avengers    Marvel  8.0         69      143    2012
## 7      Iron Man Three    Marvel  7.2         62      130    2013
## 8   Thor: The Dark World    Marvel  6.9         54      112    2013
## 9 Captain America: The Winter Soldier    Marvel  7.7         70      136    2014
## 10  Guardians of the Galaxy    Marvel  8.0         76      121    2014
## 11  Avengers: Age of Ultron    Marvel  7.3         66      141    2015
## 12             Ant-Man    Marvel  7.3         64      117    2015
## 13  Captain America: Civil War    Marvel  7.8         75      147    2016
## 14      Doctor Strange    Marvel  7.5         72      115    2016
## 15  Guardians of the Galaxy Vol. 2    Marvel  7.6         67      136    2017
## 16  Spider-Man: Homecoming    Marvel  7.4         73      133    2017
## 17      Thor: Ragnarok    Marvel  7.9         74      130    2017
## 18      Black Panther    Marvel  7.3         88      134    2018
## 19  Avengers: Infinity War    Marvel  8.5         68      149    2018
## 20  Ant-Man and the Wasp    Marvel  7.1         70      118    2018
## 21      Captain Marve    Marvel  6.9         64      123    2019
## 22  Avengers: Endgame    Marvel  8.5         78      181    2019
## 23  Spider-Man: Far from Home    Marvel  7.6         69      129    2019
##           Budget Opening.Weekend.USA Gross.USA Gross.Worldwide
## 1  140000000      98618668 318604126      585366247
## 2  150000000      55414050 134806913      263427551
## 3  200000000     128122480 312433331      623933331
## 4  150000000     65723338 181030624      449326618

```

| | | | | |
|-------|-----------|-----------|-----------|------------|
| ## 5 | 140000000 | 65058524 | 176654505 | 370569774 |
| ## 6 | 220000000 | 207438708 | 623357910 | 1518812988 |
| ## 7 | 200000000 | 174144585 | 409013994 | 1214811252 |
| ## 8 | 170000000 | 85737841 | 206362140 | 644783140 |
| ## 9 | 170000000 | 95023721 | 259766572 | 714421503 |
| ## 10 | 170000000 | 94320883 | 333176600 | 772776600 |
| ## 11 | 250000000 | 191271109 | 459005868 | 1402805868 |
| ## 12 | 130000000 | 57225526 | 180202163 | 519311965 |
| ## 13 | 250000000 | 179139142 | 408084349 | 1153296293 |
| ## 14 | 165000000 | 85058311 | 232641920 | 677718395 |
| ## 15 | 200000000 | 146510104 | 389813101 | 863756051 |
| ## 16 | 175000000 | 117027503 | 334201140 | 880166924 |
| ## 17 | 180000000 | 122744989 | 315058289 | 853977126 |
| ## 18 | 200000000 | 202003951 | 700059566 | 1346913161 |
| ## 19 | 321000000 | 257698183 | 678815482 | 2048359754 |
| ## 20 | 162000000 | 75812205 | 216648740 | 622674139 |
| ## 21 | 175000000 | 153433423 | 426829839 | 1128274794 |
| ## 22 | 356000000 | 357115007 | 858373000 | 2797800564 |
| ## 23 | 160000000 | 92579212 | 390532085 | 1131927996 |

```
ggplot(marvonly, aes(x = Rate, y = Opening.Weekend.USA)) +
  list(
    geom_point(),
    aes(color = Release),
    scale_color_gradient(high = "#132B43", low = "#56B1F7"),
    xlab("IMDB Rating (0-10)",
    ylab("USA Opening Weekend ($)"),
    scale_y_continuous(labels=comma),
    ggtitle('Marvel Movie Performance 2008-2019'),
    NULL)
```

Marvel Movie Performance 2008–2019



```
dconly <- mydata %>%
  filter(Company == 'DC')
```

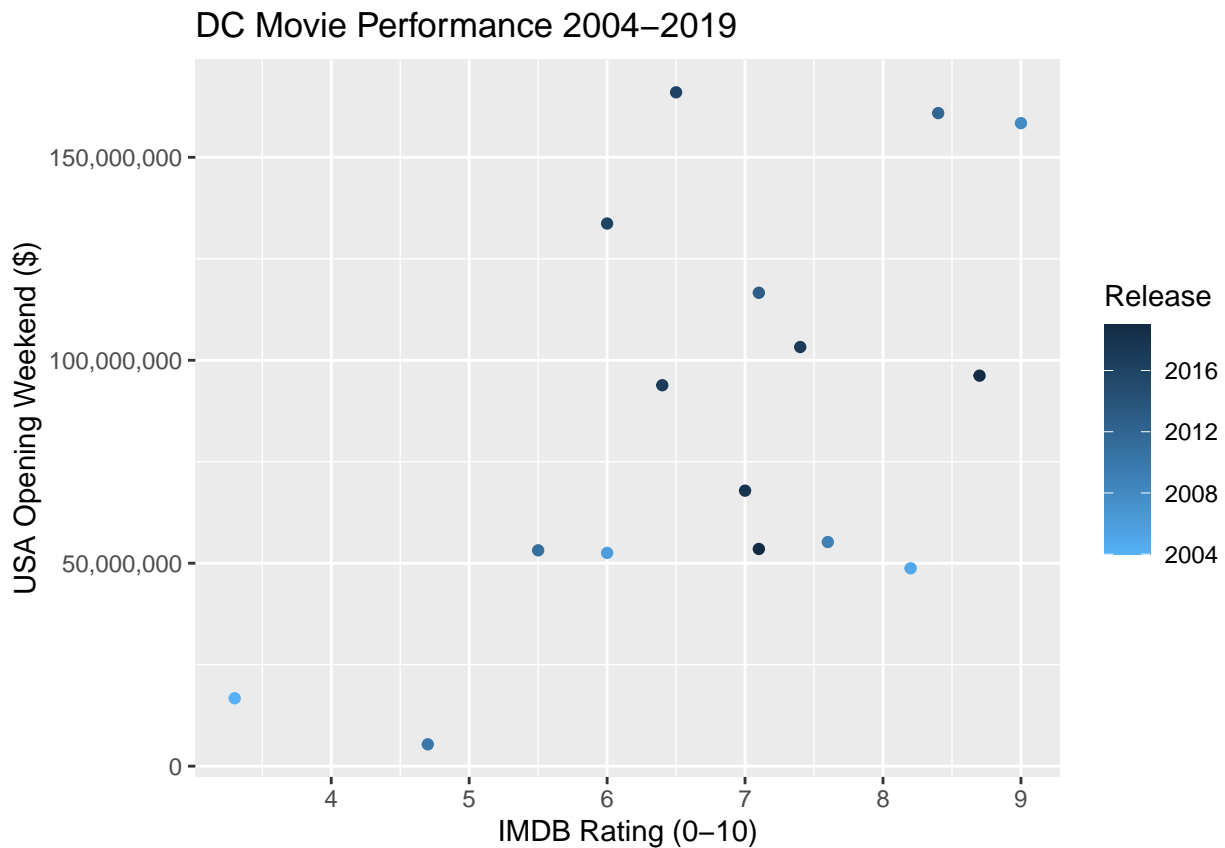
```
dconly
```

| ## | Original.Title | Company | Rate | Metascore | Minutes | Release |
|-------|------------------------------------|---------|------|-----------|---------|---------|
| ## 1 | Catwoman | DC | 3.3 | 27 | 104 | 2004 |
| ## 2 | Batman Begins | DC | 8.2 | 70 | 140 | 2005 |
| ## 3 | Superman Returns | DC | 6.0 | 72 | 154 | 2006 |
| ## 4 | The Dark Knight | DC | 9.0 | 84 | 152 | 2008 |
| ## 5 | Watchmen | DC | 7.6 | 56 | 162 | 2009 |
| ## 6 | Jonah Hex | DC | 4.7 | 33 | 81 | 2010 |
| ## 7 | Green Lantern | DC | 5.5 | 39 | 114 | 2011 |
| ## 8 | The Dark Knight Rises | DC | 8.4 | 78 | 164 | 2012 |
| ## 9 | Man of Steel | DC | 7.1 | 55 | 143 | 2013 |
| ## 10 | Batman v Superman: Dawn of Justice | DC | 6.5 | 44 | 151 | 2016 |
| ## 11 | Suicide Squad | DC | 6.0 | 40 | 123 | 2016 |
| ## 12 | Wonder Woman | DC | 7.4 | 76 | 141 | 2017 |
| ## 13 | Justice League | DC | 6.4 | 45 | 120 | 2017 |
| ## 14 | Aquaman | DC | 7.0 | 55 | 143 | 2018 |
| ## 15 | Shazam! | DC | 7.1 | 71 | 132 | 2019 |
| ## 16 | Joker | DC | 8.7 | 59 | 122 | 2019 |

| ## | Budget | Opening.Weekend.USA | Gross.USA | Gross.Worldwide |
|------|-----------|---------------------|-----------|-----------------|
| ## 1 | 100000000 | 16728411 | 40202379 | 82102379 |
| ## 2 | 150000000 | 48745440 | 206852432 | 373413297 |
| ## 3 | 270000000 | 52535096 | 200081192 | 391081192 |
| ## 4 | 185000000 | 158411483 | 535234033 | 1004934033 |

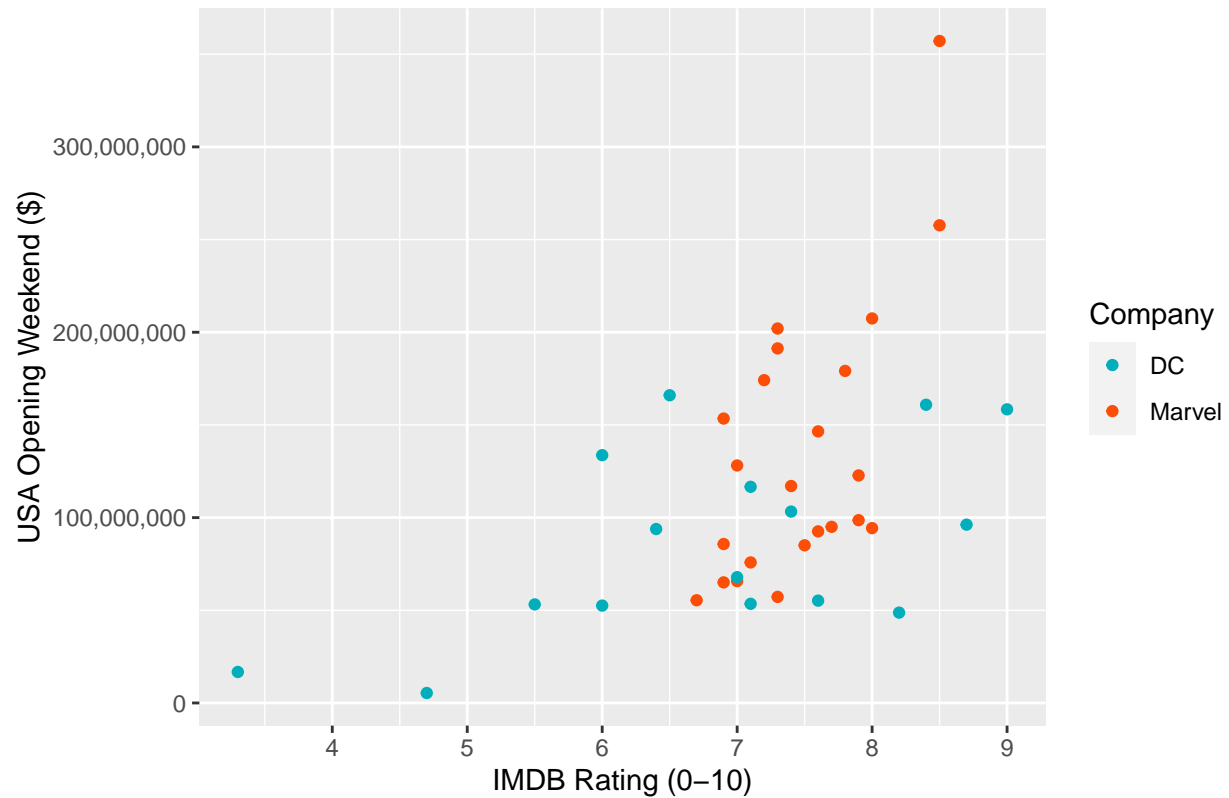
```
## 5 130000000      55214334 107509799      185258983
## 6  47000000      5379365  10547117      10903312
## 7 200000000      53174303 116601172      219851172
## 8 250000000      160887295 448139099      1081041287
## 9 225000000      116619362 291045518      668045518
## 10 250000000     166007347 330360194      873634919
## 11 175000000     133682248 325100054      746846894
## 12 149000000     103251471 412563408      821847012
## 13 300000000      93842239 229024295      657924295
## 14 160000000      67873522 335061807      1148161807
## 15 100000000      53505326 140371656      364571656
## 16  55000000      96202337 333204580      1060504580
```

```
ggplot(dconly, aes(x = Rate, y = Opening.Weekend.USA)) +
  list(
    geom_point(),
    aes(color = Release),
    scale_color_gradient(high = "#132B43", low = "#56B1F7"),
    xlab("IMDB Rating (0-10)",
    ylab("USA Opening Weekend ($)"),
    ggtitle('DC Movie Performance 2004-2019'),
    scale_y_continuous(labels=comma),
    NULL)
```



```
ggplot(mydata, aes(x = Rate, y = Opening.Weekend.USA, color = Company)) + geom_point() + xlab("IMDB Ra
```

The Performance of Marvel Versus DC Films 2004–2019



```
cor(marvonly$Rate, marvonly$Opening.Weekend.USA)
```

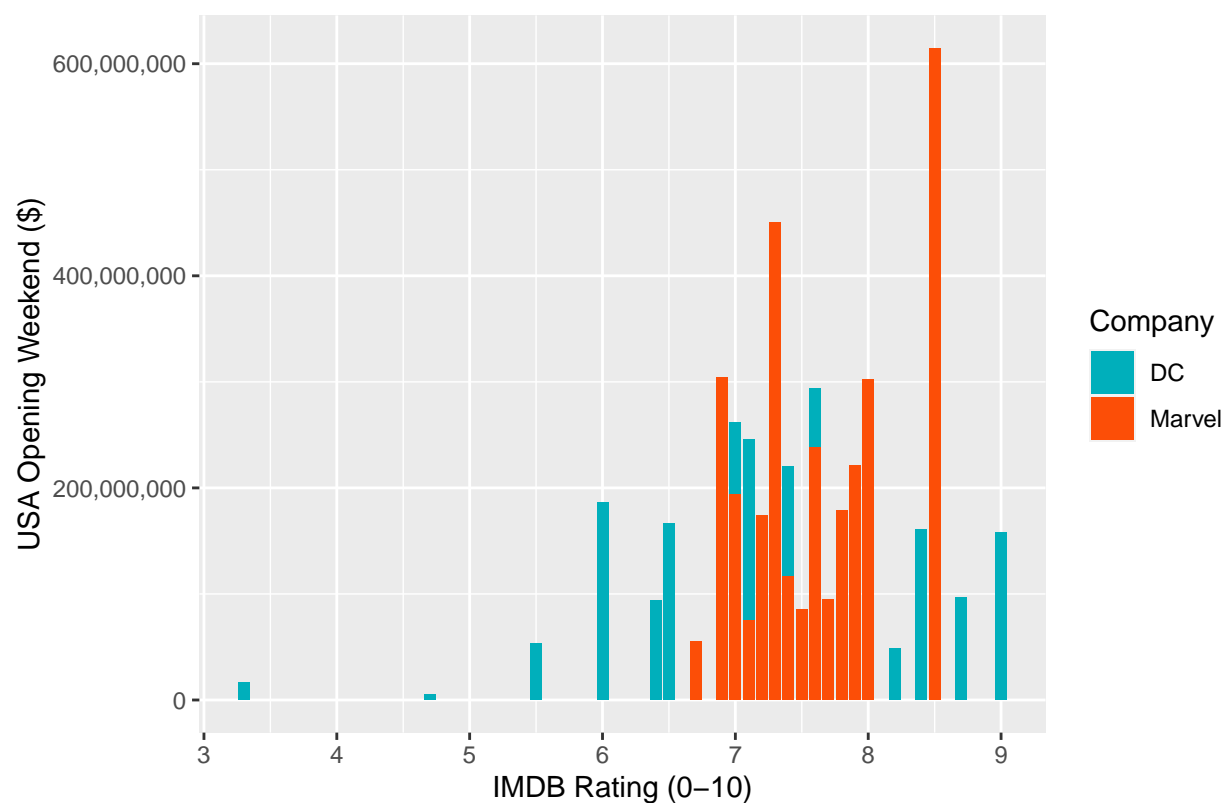
```
## [1] 0.6283303
```

```
cor(dconly$Rate, dconly$Opening.Weekend.USA)
```

```
## [1] 0.5647432
```

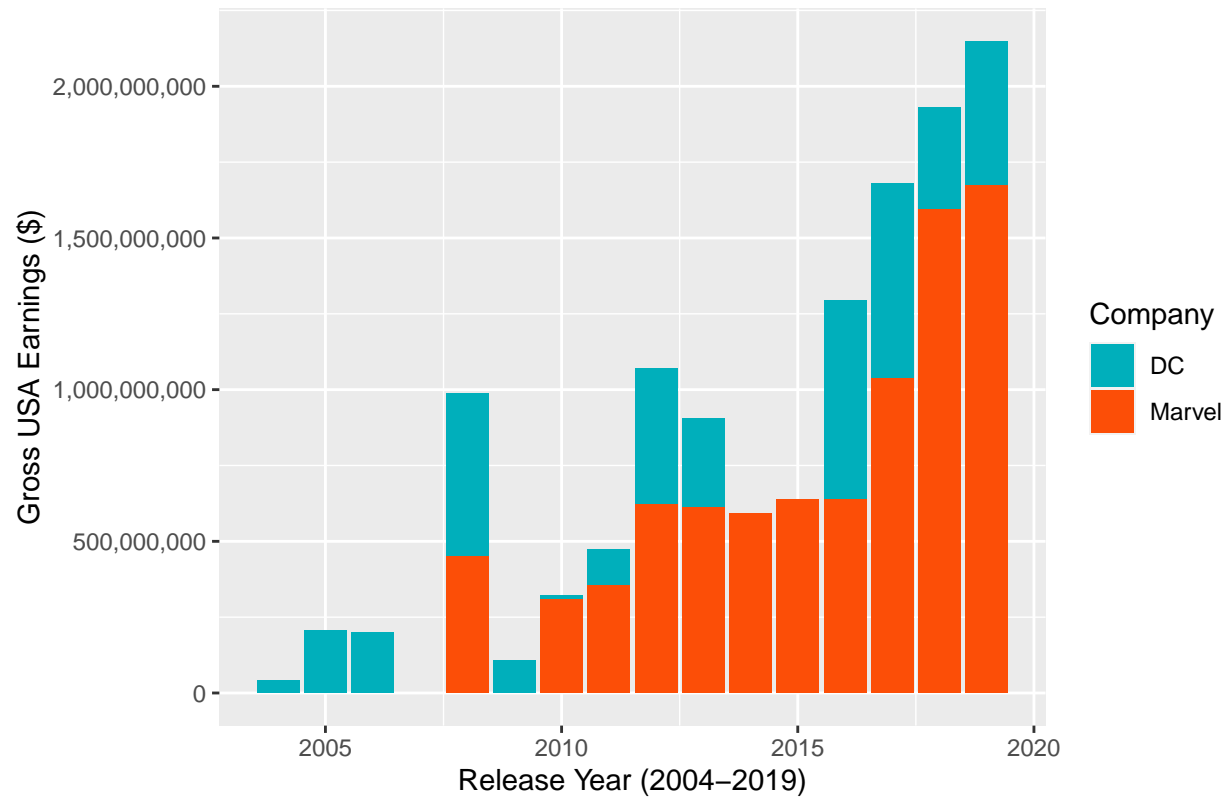
```
ggplot(mydata, aes(fill = Company, x = Rate, y = Opening.Weekend.USA)) + xlab("IMDB Rating (0-10)") + ylab("USA Opening Weekend ($")
```

The Performance of Marvel Versus DC Films 2004–2019



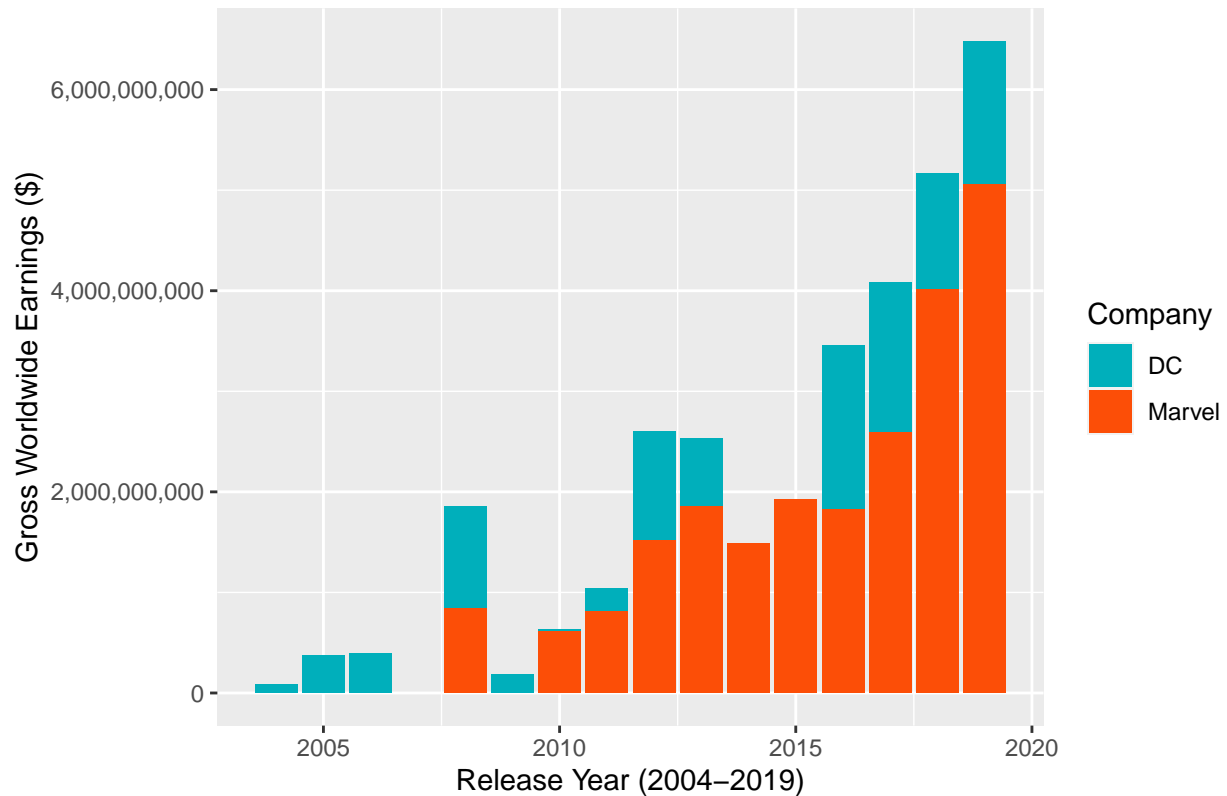
```
ggplot(mydata, aes(fill = Company, x = Release, y = Gross.USA)) + xlab("Release Year (2004-2019)") + ylab("USA Opening Weekend ($")
```


The Performance of Marvel Versus DC Films 2004–2019



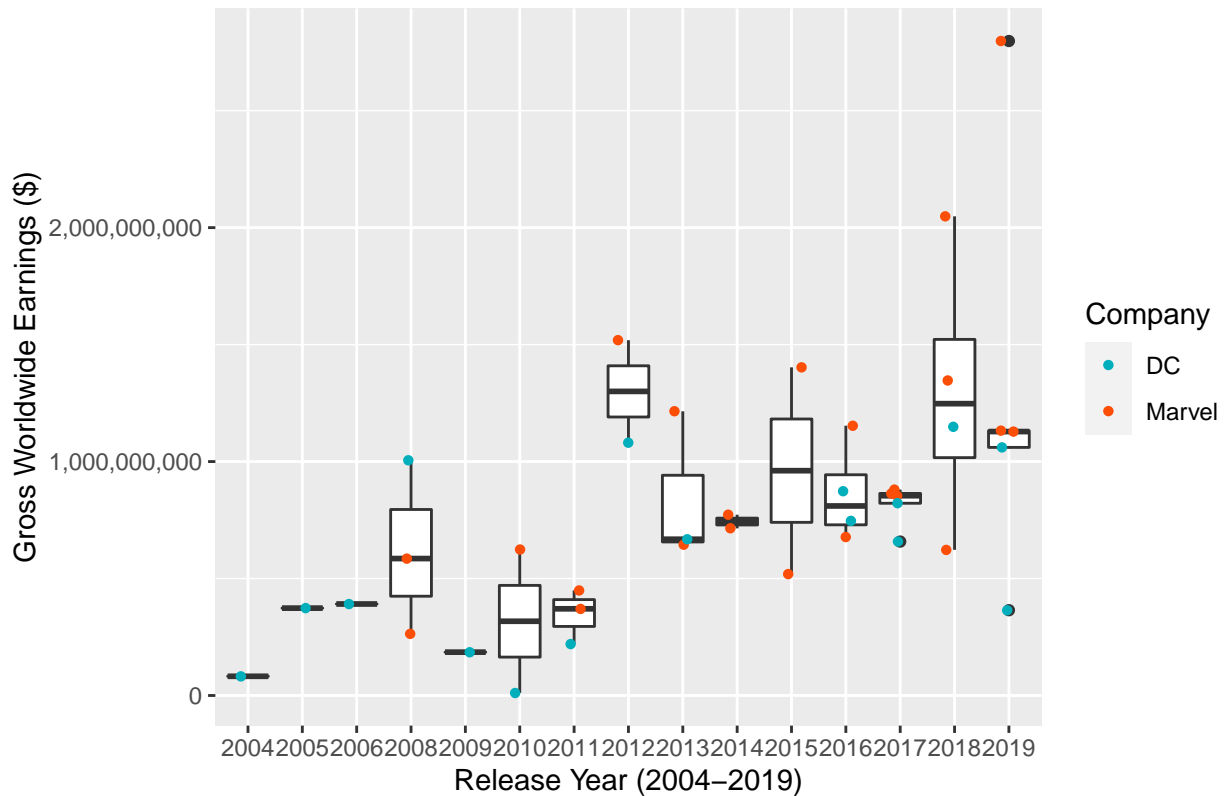
```
ggplot(mydata, aes(fill = Company, x = Release, y = Gross.Worldwide)) + xlab("Release Year (2004–2019)".
```

The Performance of Marvel Versus DC Films 2004–2019



```
mydata$Release <- as.factor(mydata$Release)
ggplot(mydata, aes(x = Release, y = Gross.Worldwide)) +
  scale_color_manual(values = c("#00AFBB", "#FC4E07")) +
  geom_boxplot() +
  geom_jitter(shape = 16, position = position_jitter(0.2), aes(color = Company)) +
  xlab("Release Year (2004–2019)") +
  ylab("Gross Worldwide Earnings ($)") +
  scale_y_continuous(labels=comma) +
  ggtitle('The Performance of Marvel Versus DC Films 2004–2019')
```

The Performance of Marvel Versus DC Films 2004–2019



```
avg_open_marv <- mean(marvonly$Opening.Weekend.USA)
avg_open_marv
```

```
## [1] 135096585
```

```
dconly <- mydata %>%
  filter(Company == 'DC')
```

```
avg_open_dc <- mean(dconly$Opening.Weekend.USA)
avg_open_dc
```

```
## [1] 86378724
```

```
cor(mydata$Rate, mydata$Opening.Weekend.USA)
```

```
## [1] 0.5216891
```

```
mydata2 <- mydata[order(-mydata$Rate),]
mydata2[, c("Original.Title", "Company", "Rate")]
```

```
##           Original.Title Company Rate
## 27           The Dark Knight      DC  9.0
## 39                Joker      DC  8.7
## 19  Avengers: Infinity War  Marvel  8.5
## 22    Avengers: Endgame  Marvel  8.5
## 31    The Dark Knight Rises      DC  8.4
## 25      Batman Begins      DC  8.2
## 6      The Avengers  Marvel  8.0
## 10  Guardians of the Galaxy  Marvel  8.0
```

| | | | |
|-------|-------------------------------------|--------|-----|
| ## 1 | Iron Man | Marvel | 7.9 |
| ## 17 | Thor:Ragnarok | Marvel | 7.9 |
| ## 13 | Captain America: Civil War | Marvel | 7.8 |
| ## 9 | Captain America: The Winter Soldier | Marvel | 7.7 |
| ## 15 | Guardians of the Galaxy Vol. 2 | Marvel | 7.6 |
| ## 23 | Spider-Man: Far from Home | Marvel | 7.6 |
| ## 28 | Watchmen | DC | 7.6 |
| ## 14 | Doctor Strange | Marvel | 7.5 |
| ## 16 | Spider-Man: Homecoming | Marvel | 7.4 |
| ## 35 | Wonder Woman | DC | 7.4 |
| ## 11 | Avengers: Age of Ultron | Marvel | 7.3 |
| ## 12 | Ant-Man | Marvel | 7.3 |
| ## 18 | Black Panther | Marvel | 7.3 |
| ## 7 | Iron Man Three | Marvel | 7.2 |
| ## 20 | Ant-Man and the Wasp | Marvel | 7.1 |
| ## 32 | Man of Steel | DC | 7.1 |
| ## 38 | Shazam! | DC | 7.1 |
| ## 3 | Iron Man 2 | Marvel | 7.0 |
| ## 4 | Thor | Marvel | 7.0 |
| ## 37 | Aquaman | DC | 7.0 |
| ## 5 | Captain America: The First Avenger | Marvel | 6.9 |
| ## 8 | Thor: The Dark World | Marvel | 6.9 |
| ## 21 | Captain Marve | Marvel | 6.9 |
| ## 2 | The Incredible Hulk | Marvel | 6.7 |
| ## 33 | Batman v Superman: Dawn of Justice | DC | 6.5 |
| ## 36 | Justice League | DC | 6.4 |
| ## 26 | Superman Returns | DC | 6.0 |
| ## 34 | Suicide Squad | DC | 6.0 |
| ## 30 | Green Lantern | DC | 5.5 |
| ## 29 | Jonah Hex | DC | 4.7 |
| ## 24 | Catwoman | DC | 3.3 |

```
mydata3 <- mydata[order(-mydata$Opening.Weekend.USA),]
mydata3[, c("Original.Title", "Company", "Rate", "Opening.Weekend.USA")]
```

| ## | Original.Title | Company | Rate | Opening.Weekend.USA |
|-------|------------------------------------|---------|------|---------------------|
| ## 22 | Avengers: Endgame | Marvel | 8.5 | 357115007 |
| ## 19 | Avengers: Infinity War | Marvel | 8.5 | 257698183 |
| ## 6 | The Avengers | Marvel | 8.0 | 207438708 |
| ## 18 | Black Panther | Marvel | 7.3 | 202003951 |
| ## 11 | Avengers: Age of Ultron | Marvel | 7.3 | 191271109 |
| ## 13 | Captain America: Civil War | Marvel | 7.8 | 179139142 |
| ## 7 | Iron Man Three | Marvel | 7.2 | 174144585 |
| ## 33 | Batman v Superman: Dawn of Justice | DC | 6.5 | 166007347 |
| ## 31 | The Dark Knight Rises | DC | 8.4 | 160887295 |
| ## 27 | The Dark Knight | DC | 9.0 | 158411483 |
| ## 21 | Captain Marve | Marvel | 6.9 | 153433423 |
| ## 15 | Guardians of the Galaxy Vol. 2 | Marvel | 7.6 | 146510104 |
| ## 34 | Suicide Squad | DC | 6.0 | 133682248 |
| ## 3 | Iron Man 2 | Marvel | 7.0 | 128122480 |
| ## 17 | Thor:Ragnarok | Marvel | 7.9 | 122744989 |
| ## 16 | Spider-Man: Homecoming | Marvel | 7.4 | 117027503 |
| ## 32 | Man of Steel | DC | 7.1 | 116619362 |
| ## 35 | Wonder Woman | DC | 7.4 | 103251471 |
| ## 1 | Iron Man | Marvel | 7.9 | 98618668 |

```
## 39                Joker      DC  8.7      96202337
## 9  Captain America: The Winter Soldier  Marvel  7.7      95023721
## 10                Guardians of the Galaxy  Marvel  8.0      94320883
## 36                Justice League      DC  6.4      93842239
## 23                Spider-Man: Far from Home  Marvel  7.6      92579212
## 8                  Thor: The Dark World  Marvel  6.9      85737841
## 14                Doctor Strange  Marvel  7.5      85058311
## 20                Ant-Man and the Wasp  Marvel  7.1      75812205
## 37                Aquaman      DC  7.0      67873522
## 4                  Thor  Marvel  7.0      65723338
## 5  Captain America: The First Avenger  Marvel  6.9      65058524
## 12                Ant-Man  Marvel  7.3      57225526
## 2                  The Incredible Hulk  Marvel  6.7      55414050
## 28                Watchmen      DC  7.6      55214334
## 38                Shazam!      DC  7.1      53505326
## 30                Green Lantern      DC  5.5      53174303
## 26                Superman Returns      DC  6.0      52535096
## 25                Batman Begins      DC  8.2      48745440
## 24                Catwoman      DC  3.3      16728411
## 29                Jonah Hex      DC  4.7      5379365
```

```
mydata4 <- mydata[order(-mydata$Gross.USA),]
mydata4[, c("Original.Title", "Company", "Rate", "Gross.USA")]
```

```
##                Original.Title Company Rate Gross.USA
## 22                Avengers: Endgame  Marvel  8.5 858373000
## 18                Black Panther  Marvel  7.3 700059566
## 19                Avengers: Infinity War  Marvel  8.5 678815482
## 6                  The Avengers  Marvel  8.0 623357910
## 27                The Dark Knight      DC  9.0 535234033
## 11                Avengers: Age of Ultron  Marvel  7.3 459005868
## 31                The Dark Knight Rises      DC  8.4 448139099
## 21                Captain Marve  Marvel  6.9 426829839
## 35                Wonder Woman      DC  7.4 412563408
## 7                  Iron Man Three  Marvel  7.2 409013994
## 13                Captain America: Civil War  Marvel  7.8 408084349
## 23                Spider-Man: Far from Home  Marvel  7.6 390532085
## 15                Guardians of the Galaxy Vol. 2  Marvel  7.6 389813101
## 37                Aquaman      DC  7.0 335061807
## 16                Spider-Man: Homecoming  Marvel  7.4 334201140
## 39                Joker      DC  8.7 333204580
## 10                Guardians of the Galaxy  Marvel  8.0 333176600
## 33  Batman v Superman: Dawn of Justice      DC  6.5 330360194
## 34                Suicide Squad      DC  6.0 325100054
## 1                  Iron Man  Marvel  7.9 318604126
## 17                Thor: Ragnarok  Marvel  7.9 315058289
## 3                  Iron Man 2  Marvel  7.0 312433331
## 32                Man of Steel      DC  7.1 291045518
## 9  Captain America: The Winter Soldier  Marvel  7.7 259766572
## 14                Doctor Strange  Marvel  7.5 232641920
## 36                Justice League      DC  6.4 229024295
## 20                Ant-Man and the Wasp  Marvel  7.1 216648740
## 25                Batman Begins      DC  8.2 206852432
## 8                  Thor: The Dark World  Marvel  6.9 206362140
## 26                Superman Returns      DC  6.0 200081192
```

```
## 4 Thor Marvel 7.0 181030624
## 12 Ant-Man Marvel 7.3 180202163
## 5 Captain America: The First Avenger Marvel 6.9 176654505
## 38 Shazam! DC 7.1 140371656
## 2 The Incredible Hulk Marvel 6.7 134806913
## 30 Green Lantern DC 5.5 116601172
## 28 Watchmen DC 7.6 107509799
## 24 Catwoman DC 3.3 40202379
## 29 Jonah Hex DC 4.7 10547117
```

```
summary(mydata)
```

```
## Original.Title      Company      Rate      Metascore
## Length:39          Length:39      Min.    :3.300  Min.    :27.00
## Class :character    Class :character  1st Qu.:6.900  1st Qu.:56.50
## Mode  :character    Mode  :character  Median :7.300  Median :67.00
##                                     Mean  :7.203  Mean  :63.67
##                                     3rd Qu.:7.850  3rd Qu.:72.50
##                                     Max.   :9.000  Max.   :88.00
##
## Minutes      Release      Budget      Opening.Weekend.USA
## Min.    : 81.0  2017    : 5  Min.    : 47000000  Min.    : 5379365
## 1st Qu.:120.5  2019    : 5  1st Qu.:150000000  1st Qu.: 65390931
## Median :130.0  2016    : 4  Median :175000000  Median : 96202337
## Mean   :131.8  2018    : 4  Mean   :184102564  Mean   :115109770
## 3rd Qu.:143.0  2008    : 3  3rd Qu.:210000000  3rd Qu.:155922453
## Max.   :181.0  2011    : 3  Max.   :356000000  Max.   :357115007
##
## (Other):15
## Gross.USA      Gross.Worldwide
## Min.    : 10547117  Min.    :1.090e+07
## 1st Qu.:203221666  1st Qu.:4.843e+08
## Median :318604126  Median :7.468e+08
## Mean   :323265923  Mean   :8.276e+08
## 3rd Qu.:408549172  3rd Qu.:1.105e+09
## Max.   :858373000  Max.   :2.798e+09
##
```

```
summary(marvonly)
```

```
## Original.Title      Company      Rate      Metascore
## Length:23          Length:23      Min.    :6.700  Min.    :54.00
## Class :character    Class :character  1st Qu.:7.050  1st Qu.:64.00
## Mode  :character    Mode  :character  Median :7.400  Median :69.00
##                                     Mean  :7.478  Mean  :68.65
##                                     3rd Qu.:7.850  3rd Qu.:73.50
##                                     Max.   :8.500  Max.   :88.00
##
## Minutes      Release      Budget      Opening.Weekend.USA
## Min.    :112.0  Min.    :2008  Min.    :130000000  Min.    : 55414050
## 1st Qu.:119.5  1st Qu.:2012  1st Qu.:161000000  1st Qu.: 85398076
## Median :129.0  Median :2015  Median :175000000  Median :117027503
## Mean   :130.3  Mean   :2015  Mean   :192782609  Mean   :135096585
## 3rd Qu.:136.0  3rd Qu.:2018  3rd Qu.:200000000  3rd Qu.:176641864
## Max.   :181.0  Max.   :2019  Max.   :356000000  Max.   :357115007
##
## Gross.USA      Gross.Worldwide
## Min.    :134806913  Min.    :2.634e+08
```

```
## 1st Qu.:224645330 1st Qu.:6.233e+08
## Median :333176600 Median :8.540e+08
## Mean :371542272 Mean :9.820e+08
## 3rd Qu.:417921916 3rd Qu.:1.184e+09
## Max. :858373000 Max. :2.798e+09
```

```
summary(dconly)
```

```
## Original.Title      Company      Rate      Metascore
## Length:16          Length:16      Min.   :3.300  Min.   :27.00
## Class :character    Class :character  1st Qu.:6.000  1st Qu.:43.00
## Mode  :character    Mode  :character  Median :7.050  Median :55.50
##                                     Mean  :6.806  Mean  :56.50
##                                     3rd Qu.:7.750  3rd Qu.:71.25
##                                     Max.   :9.000  Max.   :84.00
##
##      Minutes      Release      Budget      Opening.Weekend.USA
## Min.   : 81.0    2016   :2    Min.   : 47000000    Min.   : 5379365
## 1st Qu.:121.5    2017   :2    1st Qu.:122500000    1st Qu.: 53014501
## Median :140.5    2019   :2    Median :167500000    Median : 80857880
## Mean   :134.1    2004   :1    Mean   :171625000    Mean   : 86378724
## 3rd Qu.:151.2    2005   :1    3rd Qu.:231250000    3rd Qu.:120885084
## Max.   :164.0    2006   :1    Max.   :300000000    Max.   :166007347
##
##      (Other):7
##      Gross.USA      Gross.Worldwide
## Min.   : 10547117    Min.   :1.090e+07
## 1st Qu.:134429035    1st Qu.:3.284e+08
## Median :260034906    Median :6.630e+08
## Mean   :253868671    Mean   :6.056e+08
## 3rd Qu.:333668887    3rd Qu.:9.065e+08
## Max.   :535234033    Max.   :1.148e+09
##
```

```
marveldc.lm <- lm(Rate ~ Opening.Weekend.USA, data = mydata)
summary(marveldc.lm)
```

```
##
## Call:
## lm(formula = Rate ~ Opening.Weekend.USA, data = mydata)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.0993 -0.5682  0.1332  0.5757  1.6518
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    6.263e+00  2.932e-01  21.36 < 2e-16 ***
## Opening.Weekend.USA 8.165e-09  2.195e-09   3.72 0.000659 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9292 on 37 degrees of freedom
## Multiple R-squared:  0.2722, Adjusted R-squared:  0.2525
## F-statistic: 13.84 on 1 and 37 DF, p-value: 0.0006594
```

```
marvonly.lm <- lm(Rate ~ Opening.Weekend.USA, data = marvonly)
summary(marvonly.lm)
```

```
##
## Call:
## lm(formula = Rate ~ Opening.Weekend.USA, data = marvonly)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.65713 -0.39292  0.06683  0.27078  0.69712
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    6.897e+00  1.778e-01  38.793 < 2e-16 ***
## Opening.Weekend.USA 4.301e-09  1.162e-09   3.701  0.00132 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4003 on 21 degrees of freedom
## Multiple R-squared:  0.3948, Adjusted R-squared:  0.366
## F-statistic: 13.7 on 1 and 21 DF, p-value: 0.001324
dconly.lm <- lm(Rate ~ Opening.Weekend.USA, data = dconly)
summary(dconly.lm)
```

```
##
## Call:
## lm(formula = Rate ~ Opening.Weekend.USA, data = dconly)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.33064 -0.74076  0.04614  0.88094  2.02895
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    5.348e+00  6.541e-01   8.177 1.06e-06 ***
## Opening.Weekend.USA 1.688e-08  6.592e-09   2.560  0.0227 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.287 on 14 degrees of freedom
## Multiple R-squared:  0.3189, Adjusted R-squared:  0.2703
## F-statistic: 6.556 on 1 and 14 DF, p-value: 0.02265
```