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Project - Top Game Publisher by using Pandas

Ultimate pandas

```
In [1]: import pandas as pd  
import numpy as np  
import matplotlib.pyplot as plt  
import seaborn as sns
```

Dataframe vs Series

```
In [2]: data = pd.read_csv("https://raw.githubusercontent.com/cajjster/data_files/master/gamesales.csv")  
In [3]: data
```

Out[3]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	C
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00	
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00	
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00	
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00	

16291 rows × 10 columns

In [65]: `type(data)`Out[65]: `pandas.core.frame.DataFrame`In [5]: `data["Name"]`

```

0                               Wii Sports
1                           Super Mario Bros.
2                      Mario Kart Wii
3                  Wii Sports Resort
4             Pokemon Red/Pokemon Blue
...
16286            Woody Woodpecker in Crazy Castle 5
16287      Men in Black II: Alien Escape
16288  SCORE International Baja 1000: The Official Game
16289                   Know How 2
16290                 Spirits & Spells
Name: Name, Length: 16291, dtype: object

```

In [6]: `type(data["Name"])`Out[6]: `pandas.core.series.Series`

Inspecting Data in Pandas

In [7]: `data.head()`

Out[7]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	

In [8]: `data.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16291 entries, 0 to 16290
Data columns (total 10 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Name             16291 non-null   object 
 1   Platform         16291 non-null   object 
 2   Year             16291 non-null   int64  
 3   Genre            16291 non-null   object 
 4   Publisher        16291 non-null   object 
 5   NA_Sales         16291 non-null   float64
 6   EU_Sales         16291 non-null   float64
 7   JP_Sales         16291 non-null   float64
 8   Other_Sales      16291 non-null   float64
 9   Global Sales    16291 non-null   float64
dtypes: float64(5), int64(1), object(4)
memory usage: 1.2+ MB
```

In [9]: `data.describe()`

	Year	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sale
count	16291.000000	16291.000000	16291.000000	16291.000000	16291.000000	16291.000000
mean	2006.405561	0.265647	0.147731	0.078833	0.048426	0.540911
std	5.832412	0.822432	0.509303	0.311879	0.190083	1.567341
min	1980.000000	0.000000	0.000000	0.000000	0.000000	0.010000
25%	2003.000000	0.000000	0.000000	0.000000	0.000000	0.060000
50%	2007.000000	0.080000	0.020000	0.000000	0.010000	0.170000
75%	2010.000000	0.240000	0.110000	0.040000	0.040000	0.480000
max	2020.000000	41.490000	29.020000	10.220000	10.570000	82.740000

In [10]: `data.describe(include="0")`

Out[10]:

	Name	Platform	Genre	Publisher
count	16291	16291	16291	16291
unique	11325	31	12	576
top	Need for Speed: Most Wanted	DS	Action	Electronic Arts
freq	12	2131	3251	1339

Selecting Columns in Pandas

In [11]: `data.columns`Out[11]: `Index(['Name', 'Platform', 'Year', 'Genre', 'Publisher', 'NA_Sales', 'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global Sales'], dtype='object')`In [12]: `# Sophisticated way of selecting a column, bracket notation
data["Genre"]`Out[12]: `0 Sports
1 Platform
2 Racing
3 Sports
4 Role-Playing
 ...
16286 Platform
16287 Shooter
16288 Racing
16289 Puzzle
16290 Platform
Name: Genre, Length: 16291, dtype: object`In [13]: `# lazy way of selecting, the dot notation
data.Genre`Out[13]: `0 Sports
1 Platform
2 Racing
3 Sports
4 Role-Playing
 ...
16286 Platform
16287 Shooter
16288 Racing
16289 Puzzle
16290 Platform
Name: Genre, Length: 16291, dtype: object`In [14]: `data["Global Sales"]`

```
Out[14]: 0      82.74
         1      40.24
         2      35.82
         3      33.00
         4      31.37
         ...
        16286    0.01
        16287    0.01
        16288    0.01
        16289    0.01
        16290    0.01
Name: Global Sales, Length: 16291, dtype: float64
```

In [15]: `data[["Name", "Year", "Global Sales"]]`

	Name	Year	Global Sales
0	Wii Sports	2006	82.74
1	Super Mario Bros.	1985	40.24
2	Mario Kart Wii	2008	35.82
3	Wii Sports Resort	2009	33.00
4	Pokemon Red/Pokemon Blue	1996	31.37
...
16286	Woody Woodpecker in Crazy Castle 5	2002	0.01
16287	Men in Black II: Alien Escape	2003	0.01
16288	SCORE International Baja 1000: The Official Game	2008	0.01
16289	Know How 2	2010	0.01
16290	Spirits & Spells	2003	0.01

16291 rows × 3 columns

In [16]: `data._get_numeric_data()`

	Year	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sales
0	2006	41.49	29.02	3.77	8.46	82.74
1	1985	29.08	3.58	6.81	0.77	40.24
2	2008	15.85	12.88	3.79	3.31	35.82
3	2009	15.75	11.01	3.28	2.96	33.00
4	1996	11.27	8.89	10.22	1.00	31.37
...
16286	2002	0.01	0.00	0.00	0.00	0.01
16287	2003	0.01	0.00	0.00	0.00	0.01
16288	2008	0.00	0.00	0.00	0.00	0.01
16289	2010	0.00	0.01	0.00	0.00	0.01
16290	2003	0.01	0.00	0.00	0.00	0.01

16291 rows × 6 columns

In [17]: `data.select_dtypes("object")`

Out[17]:

	Name	Platform	Genre	Publisher
0	Wii Sports	Wii	Sports	Nintendo
1	Super Mario Bros.	NES	Platform	Nintendo
2	Mario Kart Wii	Wii	Racing	Nintendo
3	Wii Sports Resort	Wii	Sports	Nintendo
4	Pokemon Red/Pokemon Blue	GB	Role-Playing	Nintendo
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	Platform	Kemco
16287	Men in Black II: Alien Escape	GC	Shooter	Infogrames
16288	SCORE International Baja 1000: The Official Game	PS2	Racing	Activision
16289	Know How 2	DS	Puzzle	7G//AMES
16290	Spirits & Spells	GBA	Platform	Wanadoo

16291 rows × 4 columns

In [18]: `data.select_dtypes("float")`

Out[18]:

	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sales
0	41.49	29.02	3.77	8.46	82.74
1	29.08	3.58	6.81	0.77	40.24
2	15.85	12.88	3.79	3.31	35.82
3	15.75	11.01	3.28	2.96	33.00
4	11.27	8.89	10.22	1.00	31.37
...
16286	0.01	0.00	0.00	0.00	0.01
16287	0.01	0.00	0.00	0.00	0.01
16288	0.00	0.00	0.00	0.00	0.01
16289	0.00	0.01	0.00	0.00	0.01
16290	0.01	0.00	0.00	0.00	0.01

16291 rows × 5 columns

In [19]: `data.select_dtypes("int")`

Out[19]:

	Year
0	2006
1	1985
2	2008
3	2009
4	1996
...	...
16286	2002
16287	2003
16288	2008
16289	2010
16290	2003

16291 rows × 1 columns

In [20]: `data.select_dtypes("number")`

Out[20]:

	Year	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sales
0	2006	41.49	29.02	3.77	8.46	82.74
1	1985	29.08	3.58	6.81	0.77	40.24
2	2008	15.85	12.88	3.79	3.31	35.82
3	2009	15.75	11.01	3.28	2.96	33.00
4	1996	11.27	8.89	10.22	1.00	31.37
...
16286	2002	0.01	0.00	0.00	0.00	0.01
16287	2003	0.01	0.00	0.00	0.00	0.01
16288	2008	0.00	0.00	0.00	0.00	0.01
16289	2010	0.00	0.01	0.00	0.00	0.01
16290	2003	0.01	0.00	0.00	0.00	0.01

16291 rows × 6 columns

In [21]: `data.select_dtypes(["object", "int"])`

Out[21]:

	Name	Platform	Year	Genre	Publisher
0	Wii Sports	Wii	2006	Sports	Nintendo
1	Super Mario Bros.	NES	1985	Platform	Nintendo
2	Mario Kart Wii	Wii	2008	Racing	Nintendo
3	Wii Sports Resort	Wii	2009	Sports	Nintendo
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision
16289	Know How 2	DS	2010	Puzzle	7G//AMES
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo

16291 rows × 5 columns

In [22]: `data[[col for col in data.columns if data[col].nunique() <50]]`

Out[22]:

	Platform	Year	Genre
0	Wii	2006	Sports
1	NES	1985	Platform
2	Wii	2008	Racing
3	Wii	2009	Sports
4	GB	1996	Role-Playing
...
16286	GBA	2002	Platform
16287	GC	2003	Shooter
16288	PS2	2008	Racing
16289	DS	2010	Puzzle
16290	GBA	2003	Platform

16291 rows × 3 columns

Methods vs. Attributes

In [23]: `data`

Out[23]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00	
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00	
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00	
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00	

16291 rows × 10 columns

In [24]: `data.shape`Out[24]: `(16291, 10)`In [25]: `data.drop(columns="Name")`

Out [25]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
0	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	8.46	82.74
1	NES	1985	Platform	Nintendo	29.08	3.58	6.81	0.77	38.43
2	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	3.31	32.04
3	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	2.96	31.00
4	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	1.00	21.00
...
16286	GBA	2002	Platform	Kemco	0.01	0.00	0.00	0.00	0.00
16287	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	0.00	0.00
16288	PS2	2008	Racing	Activision	0.00	0.00	0.00	0.00	0.00
16289	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00	0.00	0.00
16290	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00	0.00	0.00

16291 rows × 9 columns

In [26]: `data.drop(columns="Name").shape`

Out [26]: (16291, 9)

In [27]: `data.describe()`

Out [27]:

	Year	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
count	16291.000000	16291.000000	16291.000000	16291.000000	16291.000000	16291.000000
mean	2006.405561	0.265647	0.147731	0.078833	0.048426	0.540910
std	5.832412	0.822432	0.509303	0.311879	0.190083	1.567348
min	1980.000000	0.000000	0.000000	0.000000	0.000000	0.010000
25%	2003.000000	0.000000	0.000000	0.000000	0.000000	0.060000
50%	2007.000000	0.080000	0.020000	0.000000	0.010000	0.170000
75%	2010.000000	0.240000	0.110000	0.040000	0.040000	0.480000
max	2020.000000	41.490000	29.020000	10.220000	10.570000	82.740000

In [28]: `data["Year"]`

Out [28]:

```
0      2006
1      1985
2      2008
3      2009
4      1996
      ...
16286    2002
16287    2003
16288    2008
16289    2010
16290    2003
Name: Year, Length: 16291, dtype: int64
```

```
In [29]: data["Year"].value_counts()
```

```
Out[29]: Year
2009    1431
2008    1428
2010    1257
2007    1201
2011    1136
2006    1008
2005     936
2002     829
2003     775
2004     744
2012     655
2015     614
2014     580
2013     546
2001     482
1998     379
2000     349
2016     342
1999     338
1997     289
1996     263
1995     219
1994     121
1993      60
1981      46
1992      43
1991      41
1982      36
1986      21
1989      17
1983      17
1990      16
1987      16
1988      15
1985      14
1984      14
1980       9
2017       3
2020       1
Name: count, dtype: int64
```

```
In [30]: data["Year"].value_counts(normalize=True)
```

```
Out[30]: Year
2009    0.087840
2008    0.087656
2010    0.077159
2007    0.073722
2011    0.069732
2006    0.061875
2005    0.057455
2002    0.050887
2003    0.047572
2004    0.045669
2012    0.040206
2015    0.037690
2014    0.035602
2013    0.033515
2001    0.029587
1998    0.023264
2000    0.021423
2016    0.020993
1999    0.020748
1997    0.017740
1996    0.016144
1995    0.013443
1994    0.007427
1993    0.003683
1981    0.002824
1992    0.002639
1991    0.002517
1982    0.002210
1986    0.001289
1989    0.001044
1983    0.001044
1990    0.000982
1987    0.000982
1988    0.000921
1985    0.000859
1984    0.000859
1980    0.000552
2017    0.000184
2020    0.000061
Name: proportion, dtype: float64
```

Intuition or Common sense in Pandas

```
In [31]: year = data["Year"]
```

```
In [32]: type(year)
```

```
Out[32]: pandas.core.series.Series
```

```
In [33]: type(data)
```

```
Out[33]: pandas.core.frame.DataFrame
```

```
In [34]: data.shape
```

```
Out[34]: (16291, 10)
```

```
In [35]: year.shape
```

```
In [35]: (16291,)
```

```
In [36]: data.columns
```

```
Out[36]: Index(['Name', 'Platform', 'Year', 'Genre', 'Publisher', 'NA_Sales',
   'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global Sales'],
   dtype='object')
```

```
In [37]: data["Platform"]
```

```
Out[37]: 0      Wii
1      NES
2      Wii
3      Wii
4      GB
...
16286    GBA
16287    GC
16288    PS2
16289    DS
16290    GBA
Name: Platform, Length: 16291, dtype: object
```

```
In [38]: data["Platform"].value_counts()
```

```
Out[38]: Platform
DS        2131
PS2       2127
PS3       1304
Wii       1290
X360      1234
PSP        1197
PS         1189
PC         938
XB         803
GBA        786
GC         542
3DS        499
PSV        410
PS4        336
N64        316
SNES       239
XOne       213
SAT         173
WiiU       143
2600       116
NES         98
GB          97
DC          52
GEN         27
NG          12
SCD          6
WS          6
3DO          3
TG16         2
GG          1
PCFX        1
Name: count, dtype: int64
```

```
In [39]: data.value_counts()
```

```
Out[39]:   Name          Platform Year  Genre  Pu
   blisher      NA_Sales EU_Sales JP_Sales Other_Sales Global Sal
   '98 Koshien          PS    1998  Sports  Ma
   gical Company       0.15    0.10   0.12    0.03   0.41
   Rat Attack!          N64   2000  Puzzle  Mi
   ndscape            0.02    0.00   0.00    0.00   0.02
   Rapala Pro Bass Fishing 2010          X360   2010  Sports  Ac
   tivision          0.32    0.05   0.00    0.03   0.40
   Rapala Pro Fishing          GBA   2004  Sports  Zo
   o Digital Publishing     0.04    0.02   0.00    0.00   0.06
   Hanagumi Taisen Columns          SAT   1997  Puzzle  Se
   ga                0.00    0.00   0.12    0.00   0.12
   Hanaoni: Koisomeru Koku – Eikyuu no Shirushi          PSP   2011 Adventure Id
   ea Factory        0.00    0.00   0.04    0.00   0.04
   Hanaoni: Yume no Tsudzuki          PSP   2012 Action   Id
   ea Factory        0.00    0.00   0.04    0.00   0.04
   Hanasaku Manimani          PSV   2014 Adventure 5p
   b                0.00    0.00   0.01    0.00   0.01
   iShin Chan Flipa en colores!          DS    2007 Platform 50
   5 Games          0.00    0.00   0.14    0.00   0.14
   Name: count, Length: 16291, dtype: int64
```

```
In [40]: year.sort_values()
```

```
Out[40]: 257      1980
6211     1980
1948     1980
5282     1980
1746     1980
...
5205      2016
14136     2017
16135     2017
15944     2017
5860      2020
Name: Year, Length: 16291, dtype: int64
```

```
In [41]: data.sort_values(by="Genre")
```

Out[41]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
8145		Ringling Bros. and Barnum & Bailey: Circus Fri...	DS	2009	Action	Take-Two Interactive	0.16	0.00	0.00	
4030		Madagascar: Operation Penguin	GBA	2005	Action	Activision	0.35	0.13	0.00	
11414		Dangerous Ji-San to 1000-nin no Otomodachi Yok...	3DS	2012	Action	Namco Bandai Games	0.00	0.00	0.08	
11412		Terraria	3DS	2016	Action	505 Games	0.00	0.03	0.04	
11410		Auto Destruct	PS	1998	Action	Electronic Arts	0.04	0.03	0.00	
...
15584		Elven Legacy	PC	2009	Strategy	Paradox Interactive	0.01	0.00	0.00	
11780		Hearts of Iron III	PC	2009	Strategy	Paradox Interactive	0.01	0.04	0.00	
5191		Battalion Wars 2	Wii	2007	Strategy	Nintendo	0.22	0.03	0.08	
11830		Real Time Conflict: Shogun Empires	DS	2005	Strategy	Namco Bandai Games	0.06	0.00	0.00	
1822		Pikmin 3	WiiU	2013	Strategy	Nintendo	0.45	0.31	0.29	

16291 rows × 10 columns

Method Chaining in Pandas

In [42]: `data["Genre"]`

```
Out[42]: 0      Sports
         1      Platform
         2      Racing
         3      Sports
         4    Role-Playing
         ...
        16286     Platform
        16287     Shooter
        16288     Racing
        16289     Puzzle
        16290     Platform
Name: Genre, Length: 16291, dtype: object
```

In [43]: `data["Genre"].value_counts()`

```
Out[43]: Genre
          Action      3251
          Sports      2304
          Misc       1686
          Role-Playing 1470
          Shooter     1282
          Adventure    1274
          Racing       1225
          Platform      875
          Simulation    848
          Fighting      836
          Strategy      670
          Puzzle        570
          Name: count, dtype: int64
```

```
In [44]: data["Genre"].value_counts().sort_index()
```

```
Out[44]: Genre
          Action      3251
          Adventure    1274
          Fighting      836
          Misc       1686
          Platform      875
          Puzzle        570
          Racing       1225
          Role-Playing 1470
          Shooter     1282
          Simulation    848
          Sports      2304
          Strategy      670
          Name: count, dtype: int64
```

```
In [45]: data["Genre"].sort_index()
```

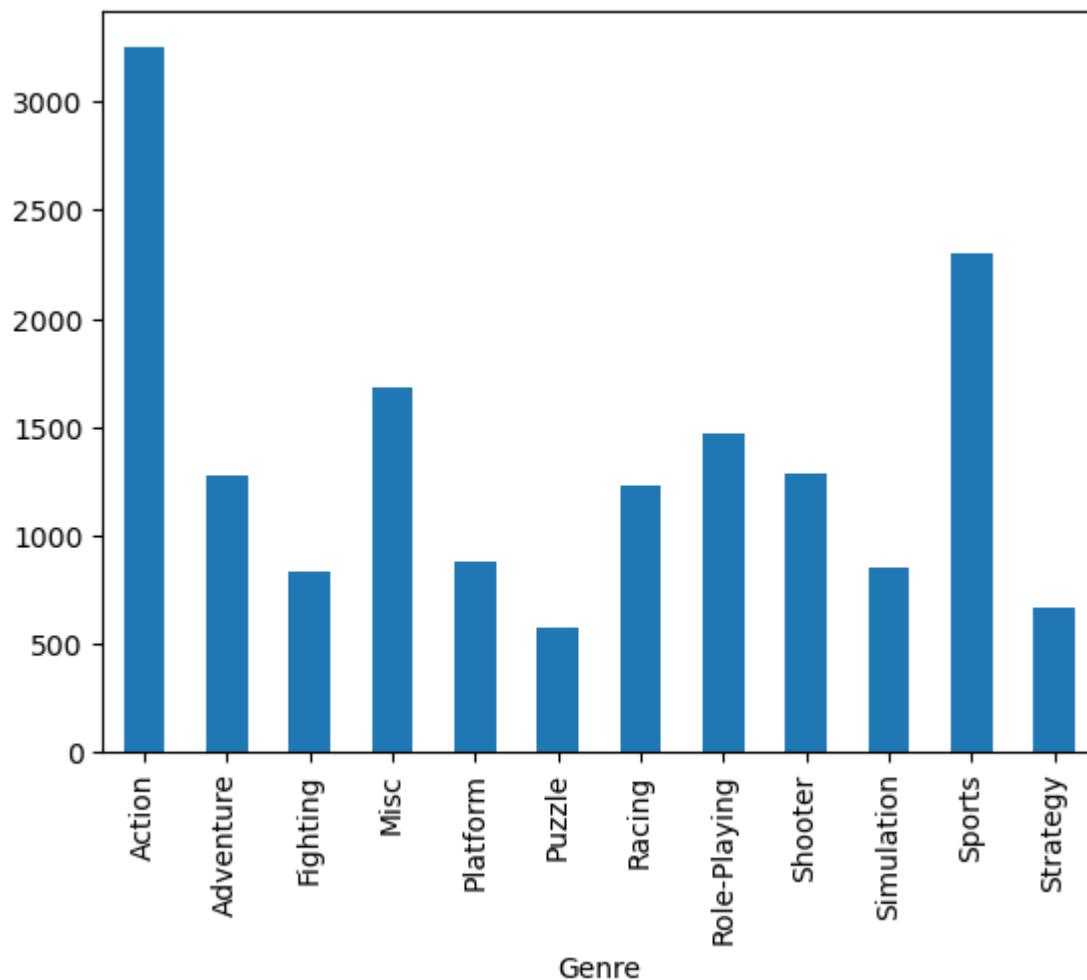
```
Out[45]: 0           Sports
1           Platform
2           Racing
3           Sports
4           Role-Playing
...
16286      Platform
16287      Shooter
16288      Racing
16289      Puzzle
16290      Platform
          Name: Genre, Length: 16291, dtype: object
```

```
In [46]: data["Genre"].sort_index().value_counts()
```

```
Out[46]: Genre
          Action      3251
          Sports      2304
          Misc       1686
          Role-Playing 1470
          Shooter     1282
          Adventure    1274
          Racing       1225
          Platform      875
          Simulation    848
          Fighting      836
          Strategy      670
          Puzzle        570
          Name: count, dtype: int64
```

```
In [47]: data["Genre"].value_counts().sort_index().plot.bar()
```

```
Out[47]: <Axes: xlabel='Genre'>
```



loc[] and iloc []

```
In [48]: data
```

Out[48]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00	
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00	
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00	
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00	

16291 rows × 10 columns

In [49]: `data.iloc[4]`

```
Name          Pokemon Red/Pokemon Blue
Platform           GB
Year             1996
Genre            Role-Playing
Publisher        Nintendo
NA_Sales        11.27
EU_Sales         8.89
JP_Sales        10.22
Other_Sales      1.0
Global_Sales    31.37
Name: 4, dtype: object
```

In [50]: `data.iloc[:5]`

Out[50]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	

In [51]: `#[:start:stop:step]
data.iloc[1:10]`

Out[51]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
5	Tetris	GB	1989	Puzzle	Nintendo	23.20	2.26	4.22	
6	New Super Mario Bros.	DS	2006	Platform	Nintendo	11.38	9.23	6.50	
7	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.20	2.93	
8	New Super Mario Bros. Wii	Wii	2009	Platform	Nintendo	14.59	7.06	4.70	
9	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	

In [52]: `data.iloc[1:10:2]`

Out[52]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	0.77
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	2.96
5	Tetris	GB	1989	Puzzle	Nintendo	23.20	2.26	4.22	0.58
7	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.20	2.93	2.85
9	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	0.47

In [53]:

data.iloc[1:10:3]

Out[53]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
7	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.20	2.93	

In [54]:

data.iloc[1:]

Out [54]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	
1		Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2		Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3		Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4		Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
5		Tetris	GB	1989	Puzzle	Nintendo	23.20	2.26	4.22	
...	
16286		Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00	
16287		Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	
16288		SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00	
16289		Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00	
16290		Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00	

16290 rows × 10 columns

In [55]: `data.iloc[-10:]`

Out[55]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
16281	Mega Brain Boost	DS	2008	Puzzle	Majesco Entertainment	0.01	0.00	0.00
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...	PSV	2016	Action	dramatic create	0.00	0.00	0.00
16283	Eiyuu Densetsu: Sora no Kiseki Material Collect...	PSP	2007	Role-Playing	Falcom Corporation	0.00	0.00	0.00
16284	Myst IV: Revelation	PC	2004	Adventure	Ubisoft	0.01	0.00	0.00
16285	Plushees	DS	2008	Simulation	Destineer	0.01	0.00	0.00
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

In [56]:

```
# [start:stop:step]
data.iloc[:,2:6]
```

Out [56]:

	Year	Genre	Publisher	NA_Sales
0	2006	Sports	Nintendo	41.49
1	1985	Platform	Nintendo	29.08
2	2008	Racing	Nintendo	15.85
3	2009	Sports	Nintendo	15.75
4	1996	Role-Playing	Nintendo	11.27
...
16286	2002	Platform	Kemco	0.01
16287	2003	Shooter	Infogrames	0.01
16288	2008	Racing	Activision	0.00
16289	2010	Puzzle	7G//AMES	0.00
16290	2003	Platform	Wanadoo	0.01

16291 rows × 4 columns

In [57]: `data.iloc[3:10,5:-2]`

Out [57]:

	NA_Sales	EU_Sales	JP_Sales
3	15.75	11.01	3.28
4	11.27	8.89	10.22
5	23.20	2.26	4.22
6	11.38	9.23	6.50
7	14.03	9.20	2.93
8	14.59	7.06	4.70
9	26.93	0.63	0.28

In [58]: `data.iloc[:1000]`

Out[58]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22	
...
995	Star Wars: Battlefront	XB	2004	Shooter	Activision	1.24	0.45	0.00	
996	Pro Evolution Soccer	PS2	2001	Sports	Konami Digital Entertainment	0.06	0.90	0.53	
997	Crackdown	X360	2007	Shooter	Microsoft Game Studios	1.00	0.54	0.03	
998	Yoshi	NES	1991	Puzzle	Nintendo	0.70	0.13	0.91	
999	Disney's Aladdin	SNES	1993	Platform	Capcom	0.94	0.34	0.21	

1000 rows × 10 columns

In [59]: `data.loc[:1000, "Publisher"]`

Out[59]:

0	Nintendo
1	Nintendo
2	Nintendo
3	Nintendo
4	Nintendo
...	
996	Konami Digital Entertainment
997	Microsoft Game Studios
998	Nintendo
999	Capcom
1000	Nintendo

Name: Publisher, Length: 1001, dtype: object

In [60]: `data.loc[:100, ["Platform", "Publisher", "NA_Sales"]]`

Out[60]:

	Platform	Publisher	NA_Sales
0	Wii	Nintendo	41.49
1	NES	Nintendo	29.08
2	Wii	Nintendo	15.85
3	Wii	Nintendo	15.75
4	GB	Nintendo	11.27
...
96	NES	Nintendo	5.39
97	3DS	Nintendo	3.24
98	X360	Activision	4.79
99	X360	Electronic Arts	4.46
100	Wii	Nintendo	3.83

101 rows × 3 columns

In [61]: `data.loc[100,"NA_Sales"]`

Out[61]: 3.83

In [62]: `# Change/ update a value in a dataframe
data.loc[100,"NA_Sales"]=3.83`In [63]: `data.loc[100,"NA_Sales"]`

Out[63]: 3.83

Filter with conditional logic using loc []

In [64]: `for i in data [["Name", "Platform", "Year", "Genre", "Publisher"]]:
 print(i.upper())
 print(data[i].unique())
 print()`

NAME

['Wii Sports' 'Super Mario Bros.' 'Mario Kart Wii' ... 'Plushees'
 'Woody Woodpecker in Crazy Castle 5' 'Know How 2']

PLATFORM

['Wii' 'NES' 'GB' 'DS' 'X360' 'PS3' 'PS2' 'SNES' 'GBA' '3DS' 'PS4' 'N64'
 'PS' 'XB' 'PC' '2600' 'PSP' 'XOne' 'GC' 'WiiU' 'GEN' 'DC' 'PSV' 'SAT'
 'SCD' 'WS' 'NG' 'TG16' '3DO' 'GG' 'PCFX']

YEAR

[2006	1985	2008	2009	1996	1989	1984	2005	1999	2007	2010	2013	2004	1990
1988	2002	2001	2011	1998	2015	2012	2014	1992	1997	1993	1994	1982	2003
1986	2000	1995	2016	1991	1981	1987	1980	1983	2020	2017]			

GENRE

['Sports' 'Platform' 'Racing' 'Role-Playing' 'Puzzle' 'Misc' 'Shooter'
 'Simulation' 'Action' 'Fighting' 'Adventure' 'Strategy']

PUBLISHER

['Nintendo' 'Microsoft Game Studios' 'Take-Two Interactive'
 'Sony Computer Entertainment' 'Activision' 'Ubisoft' 'Bethesda Softworks'
 'Electronic Arts' 'Sega' 'SquareSoft' 'Atari' '505 Games' 'Capcom'
 'GT Interactive' 'Konami Digital Entertainment'
 'Sony Computer Entertainment Europe' 'Square Enix' 'LucasArts'
 'Virgin Interactive' 'Warner Bros. Interactive Entertainment'
 'Universal Interactive' 'Eidos Interactive' 'RedOctane' 'Vivendi Games'
 'Enix Corporation' 'Namco Bandai Games' 'Palcom' 'Hasbro Interactive'
 'THQ' 'Fox Interactive' 'Acclaim Entertainment' 'MTV Games'
 'Disney Interactive Studios' 'Majesco Entertainment' 'Codemasters'
 'Red Orb' 'Level 5' 'Arena Entertainment' 'Midway Games' 'JVC'
 'Deep Silver' '989 Studios' 'NCSoft' 'UEP Systems' 'Parker Bros.' 'Maxis'
 'Imagic' 'Tecmo Koei' 'Valve Software' 'ASCII Entertainment' 'Mindscape'
 'Infogrames' 'Unknown' 'Square' 'Valve' 'Activision Value' 'Banpresto'
 'D3Publisher' 'Oxygen Interactive' 'Red Storm Entertainment'
 'Video System' 'Hello Games' 'Global Star' 'Gotham Games'
 'Westwood Studios' 'GungHo' 'Crave Entertainment' 'Hudson Soft' 'Coleco'
 'Rising Star Games' 'Atlus' 'TDK Mediactive' 'ASC Games' 'Zoo Games'
 'Accolade' 'Sony Online Entertainment' '3DO' 'RTL' 'Natsume'
 'Focus Home Interactive' 'Alchemist' 'Black Label Games'
 'SouthPeak Games' 'Mastertronic' 'Ocean' 'Zoo Digital Publishing'
 'Psygnosis' 'City Interactive' 'Empire Interactive' 'Success' 'Compile'
 'Russel' 'Taito' 'Agetec' 'GSP' 'Microprose' 'Play It'
 'Slightly Mad Studios' 'Tomy Corporation' 'Sammy Corporation'
 'Koch Media' 'Game Factory' 'Titus' 'Marvelous Entertainment' 'Genki'
 'Mojang' 'Pinnacle' 'CTO SpA' 'TalonSoft' 'Crystal Dynamics' 'SCi'
 'Quelle' 'mixi, Inc' 'Rage Software' 'Ubisoft Annecy' 'Scholastic Inc.'
 'Interplay' 'Mystique' 'ChunSoft' 'Square EA'
 '20th Century Fox Video Games' 'Avanquest Software'
 'Hudson Entertainment' 'Nordic Games' 'Men-A-Vision' 'Nobilis'
 'Big Ben Interactive' 'Touchstone' 'Spike' 'Jester Interactive'
 'Nippon Ichi Software' 'LEGO Media' 'Quest' 'Illusion Softworks'
 'Tigervision' 'Funbox Media' 'Rocket Company' 'Metro 3D'
 'Mattel Interactive' 'IE Institute' 'Rondomedia'
 'Sony Computer Entertainment America' 'Universal Gamex' 'Ghostlight'
 'Wizard Video Games' 'BMG Interactive Entertainment' 'PQube'
 'Trion Worlds' 'Laguna' 'Ignition Entertainment' 'Takara'
 'Kadokawa Shoten' 'Destineer' 'Enterbrain' 'Xseed Games' 'Imagineer'
 'System 3 Arcade Software' 'CPG Products' 'Aruze Corp' 'Gamebridge'
 'Midas Interactive Entertainment' 'Jaleco' 'Answer Software' 'XS Games'
 'Activision Blizzard' 'Pack In Soft' 'Rebellion' 'Xplosiv'
 'GameMill Entertainment' 'Wanadoo' 'NovaLogic' 'Telltale Games' 'Epoch'
 'BAM! Entertainment' 'Knowledge Adventure' 'Mastiff' 'Tetris Online'
 'Harmonix Music Systems' 'ESP' 'TYO' 'Telegames' 'Mud Duck Productions'
 'Screenlife' 'Pioneer LDC' 'Magical Company' 'Mentor Interactive' 'Kemco'

'Human Entertainment' 'Avanquest' 'Data Age' 'Electronic Arts Victor'
'Black Bean Games' 'Jack of All Games' '989 Sports' 'Takara Tomy'
'Media Rings' 'Elf' 'Starfish' 'Zushi Games' 'Jorudan'
'Destination Software, Inc' 'New' 'Brash Entertainment'
'ITT Family Games' 'PopCap Games' 'Home Entertainment Suppliers'
'Ackkstudios' 'Starpath Corp.' 'P2 Games' 'BPS' 'Gathering of Developers'
'NewKidCo' 'Storm City Games' 'CokeM Interactive' 'CBS Electronics'
'Magix' 'Marvelous Interactive' 'Kalypso Media'
'Nihon Falcom Corporation' 'Wargaming.net' 'Angel Studios'
'Arc System Works' 'Playmates' 'SNK Playmore' 'Hamster Corporation'
'From Software' 'Nippon Columbia' 'Nichibutsu' 'Little Orbit'
'Conspiracy Entertainment' 'DTP Entertainment' 'Hect' 'Mumbo Jumbo'
'Pacific Century Cyber Works' 'Indie Games' 'Liquid Games' 'NEC' 'Axela'
'ArtDink' 'Sunsoft' 'Gust' 'SNK' 'NEC Interchannel' 'FuRyu'
'Xing Entertainment' 'ValuSoft' 'Victor Interactive' 'Detn8 Games'
'American Softworks' 'Nordcurrent' 'Bomb' 'Falcom Corporation'
'AQ Interactive' 'CCP' 'Milestone S.r.l.' 'JoWood Productions'
'Seta Corporation' 'On Demand' 'NCS' 'Aspyr' 'Gremlin Interactive Ltd'
'Agatsuma Entertainment' 'Compile Heart' 'Culture Brain' 'Mad Catz'
'Shogakukan' 'Merscom LLC' 'Rebellion Developments' 'Nippon Telenet'
'TDK Core' 'bitComposer Games' 'Foreign Media Games' 'Astragon' 'SSI'
'Kadokawa Games' 'Idea Factory' 'Performance Designed Products'
'Asylum Entertainment' 'Core Design Ltd.' 'PlayV' 'UFO Interactive'
'Idea Factory International' 'Playlogic Game Factory' 'Essential Games'
'Adeline Software' 'Funcom' 'Panther Software' 'Blast! Entertainment Ltd'
'Game Life' 'DSI Games' 'Avalon Interactive' 'Popcorn Arcade'
'Neko Entertainment' 'Vir2L Studios' 'Aques' 'Syscom'
'White Park Bay Software' 'System 3' 'Vatical Entertainment' 'Daedalic'
'EA Games' 'Media Factory' 'Vic Tokai' 'The Adventure Company'
'Game Arts' 'Broccoli' 'Acquire' 'General Entertainment'
'Excalibur Publishing' 'Imadio' 'Swing! Entertainment'
'Sony Music Entertainment' 'Aqua Plus' 'Paradox Interactive'
'Hip Interactive' 'DreamCatcher Interactive' 'Tripwire Interactive'
'Sting' 'Yacht Club Games' 'SCS Software' 'Bigben Interactive'
'Havas Interactive' 'Slitherine Software' 'Graffiti' 'Funsta' 'Telstar'
'U.S. Gold' 'DreamWorks Interactive' 'Data Design Interactive' 'MT0'
'DHM Interactive' 'FunSoft' 'SPS' 'Bohemia Interactive'
'Reef Entertainment' 'Tru Blu Entertainment' 'Moss' 'T&E Soft' '0-Games'
'Aksys Games' 'NDA Productions' 'Data East' 'Time Warner Interactive'
'Gainax Network Systems' 'Daito' '03 Entertainment' 'Gameloft'
'Xicat Interactive' 'Simon & Schuster Interactive' 'Valcon Games'
'PopTop Software' 'TOHO' 'HMH Interactive' '5pb' 'Cave'
'CDV Software Entertainment' 'Microids' 'PM Studios' 'Paon' 'Micro Cabin'
'GameTek' 'Benesse' 'Type-Moon' 'Enjoy Gaming ltd.' 'Asmik Corp'
'Interplay Productions' 'Asmik Ace Entertainment' 'inXile Entertainment'
'Image Epoch' 'Phantom EFX' 'Evolved Games' 'responDESIGN'
'Culture Publishers' 'Griffin International' 'Hackberry' 'Hearty Robin'
'Nippon Amuse' 'Origin Systems' 'Seventh Chord' 'Mitsui' 'Milestone'
'Abylight' 'Flight-Plan' 'Glams' 'Locus' 'Warp' 'Daedalic Entertainment'
'Alternative Software' 'Myelin Media' 'Mercury Games'
'Irem Software Engineering' 'Sunrise Interactive' 'Elite'
'Evolution Games' 'Tivola' 'Global A Entertainment' 'Edia' 'Athena'
'Aria' 'Gamecock' 'Tommo' 'Altron' 'Happinet' 'iWin' 'Media Works'
'Fortyfive' 'Revolution Software' 'Imax' 'Crimson Cow' '10TACLE Studios'
'Groove Games' 'Pack-In-Video' 'Insomniac Games'
'Ascaron Entertainment GmbH' 'Asgard' 'Ecole' 'Yumedia' 'Phenomedia'
'HAL Laboratory' 'Grand Prix Games' 'DigiCube' 'Creative Core'
'Kaga Create' 'WayForward Technologies' 'LSP Games' 'ASCII Media Works'
'Coconuts Japan' 'Arika' 'Ertain' 'Marvel Entertainment' 'Prototype'
'Phantagram' '1C Company' 'The Learning Company' 'TechnoSoft' 'Vap'
'Misawa' 'Tradewest' 'Team17 Software' 'Yeti' 'Pow' 'Navarre Corp'
'MediaQuest' 'Max Five' 'Comfort' 'Monte Christo Multimedia'
'Pony Canyon' 'Riverhillsoft' 'Summitsoft' 'Milestone S.r.l' 'Playmore'
'MLB.com' 'Kool Kizz' 'Flashpoint Games' '49Games' 'Legacy Interactive'

'Alawar Entertainment' 'CyberFront' 'Cloud Imperium Games Corporation'
 'Societa' 'Virtual Play Games' 'Interchannel' 'Sonnet' 'Experience Inc.'
 'Zenrin' 'Iceberg Interactive' 'Ivolgamus' '2D Boy' 'MC2 Entertainment'
 'Kando Games' 'Just Flight' 'Office Create' 'Mamba Games' 'Fields'
 'Princess Soft' 'Maximum Family Games' 'Berkeley' 'Fuji'
 'Dusenberry Martin Racing' 'imageepoch Inc.' 'Big Fish Games'
 'Her Interactive' 'Kamui' 'ASK' 'TopWare Interactive' 'Headup Games'
 'KSS' 'Cygames' 'KID' 'Quinrose' 'Sunflowers' 'dramatic create' 'TGL'
 'Encore' 'Extreme Entertainment Group' 'Intergrow' 'G.Rev' 'Sweets'
 'Kokopeli Digital Studios' 'Number None' 'Nexon' 'id Software'
 'BushiRoad' 'Tryfirst' 'Strategy First' '7G//AMES' 'GN Software' "Yuke's"
 'Easy Interactive' 'Licensed 4U' 'FuRyu Corporation'
 'Lexicon Entertainment' 'Paon Corporation' 'Kids Station' 'GOA'
 'Graphsim Entertainment' 'King Records' 'Introversion Software'
 'Minato Station' 'Devolver Digital' 'Blue Byte' 'Gaga'
 'Yamasa Entertainment' 'Plenty' 'Views' 'fonfun' 'NetRevo'
 'Codemasters Online' 'Quintet' 'Phoenix Games' 'Dorart' 'Marvelous Games'
 'Focus Multimedia' 'Imageworks' 'Karin Entertainment' 'Aerosoft'
 'Technos Japan Corporation' 'Gakken' 'Mirai Shounen' 'Datam Polystar'
 'Saurus' 'HuneX' 'Revolution (Japan)' 'Giza10' 'Visco' 'Alvion' 'Mycom'
 'Giga' 'Warashi' 'System Soft' 'Sold Out' 'Lighthouse Interactive'
 'Masque Publishing' 'RED Entertainment' 'Michaelsoft'
 'Media Entertainment' 'New World Computing' 'Genterprise'
 'Interworks Unlimited, Inc.' 'Boost On' 'Stainless Games'
 'EON Digital Entertainment' 'Epic Games' 'Naxat Soft'
 'Ascaron Entertainment' 'Piacci' 'Nitroplus' 'Paradox Development'
 'Otomate' 'Ongakukan' 'Commseed' 'Inti Creates' 'Takuyo'
 'Interchannel-Holon' 'Rain Games' 'UIG Entertainment']

In [72]: `wii = data ["Platform"] == "Wii"`

In [73]: `wii`

Out[73]:

0	True
1	False
2	True
3	True
4	False
...	
16286	False
16287	False
16288	False
16289	False
16290	False

Name: Platform, Length: 16291, dtype: bool

In [74]: `wii.value_counts()`

Out[74]:

Platform	count
False	15001
True	1290

Name: count, dtype: int64

In [75]: `data.loc[wii]`

Out[75]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
7	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.20	2.93
8	New Super Mario Bros. Wii	Wii	2009	Platform	Nintendo	14.59	7.06	4.70
...
16212	Teenage Mutant Ninja Turtles	Wii	2007	Action	Konami Digital Entertainment	0.00	0.01	0.00
16246	Mahou Sensei Negima!? Neo-Pactio Fight!!	Wii	2007	Fighting	Marvelous Interactive	0.00	0.00	0.01
16266	Mini Desktop Racing	Wii	2007	Racing	Popcorn Arcade	0.01	0.00	0.00
16267	Yattaman Wii: BikkuriDokkiri Machine de Mou Ra...	Wii	2008	Racing	Takara Tomy	0.00	0.00	0.01
16274	Fit & Fun	Wii	2011	Sports	Unknown	0.00	0.01	0.00

1290 rows × 10 columns

In [76]: `data.loc[data["Platform"] == "PS2"]`

Out[76]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
17	Grand Theft Auto: San Andreas		PS2	2004	Action	Take-Two Interactive	9.43	0.40	0.4
24	Grand Theft Auto: Vice City		PS2	2002	Action	Take-Two Interactive	8.41	5.49	0.4
28	Gran Turismo 3: A-Spec		PS2	2001	Racing	Sony Computer Entertainment	6.85	5.09	1.8
38	Grand Theft Auto III		PS2	2001	Action	Take-Two Interactive	6.99	4.51	0.30
47	Gran Turismo 4		PS2	2004	Racing	Sony Computer Entertainment	3.01	0.01	1.10
...
16252	Sugar + Spice! Anoko no Suteki na Nanimokamo		PS2	2008	Adventure	Alchemist	0.00	0.00	0.0
16254	Kanokon: Esuui		PS2	2008	Adventure	5pb	0.00	0.00	0.0
16265	Scarlett: Nichijou no Kyoukaisen		PS2	2008	Adventure	Kadokawa Shoten	0.00	0.00	0.0
16273	Real Rode		PS2	2008	Adventure	Kadokawa Shoten	0.00	0.00	0.0
16288	SCORE International Baja 1000: The Official Game		PS2	2008	Racing	Activision	0.00	0.00	0.01

2127 rows × 10 columns

In [77]: `data.loc[data["JP_Sales"] > data["EU_Sales"]]`

Out[77]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
1	Super Mario Bros.		NES	1985	Platform	Nintendo	29.08	3.58	6.81
4	Pokemon Red/Pokemon Blue		GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
5	Tetris		GB	1989	Puzzle	Nintendo	23.20	2.26	4.22
12	Pokemon Gold/Pokemon Silver		GB	1999	Role-Playing	Nintendo	9.00	6.18	7.20
17	Grand Theft Auto: San Andreas		PS2	2004	Action	Take-Two Interactive	9.43	0.40	0.41
...
16268	Neo Angelique Special		PSP	2008	Adventure	Tecmo Koei	0.00	0.00	0.01
16273	Real Rode		PS2	2008	Adventure	Kadokawa Shoten	0.00	0.00	0.01
16280	Mezase!! Tsuri Master DS		DS	2009	Sports	Hudson Soft	0.00	0.00	0.01
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...		PSV	2016	Action	dramatic create	0.00	0.00	0.01
16283	Eiyuu Densetsu: Sora no Kiseki Material Collect...		PSP	2007	Role-Playing	Falcom Corporation	0.00	0.00	0.01

4554 rows × 10 columns

In [78]: `data.loc[data["JP_Sales"] > data["EU_Sales"], "Name"]`

Out[78]:

```

1           Super Mario Bros.
4           Pokemon Red/Pokemon Blue
5           Tetris
12          Pokemon Gold/Pokemon Silver
17          Grand Theft Auto: San Andreas
...
16268        Neo Angelique Special
16273        Real Rode
16280        Mezase!! Tsuri Master DS
16282        Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...
16283        Eiyuu Densetsu: Sora no Kiseki Material Collect...
Name: Name, Length: 4554, dtype: object

```

In [80]: `data.loc[(data["Platform"] == "Wii") & (data["Genre"] == "Role-Playing")]`

Out[80]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Ot
709	Monster Hunter Tri	Wii	2009	Role-Playing	Nintendo	0.67	0.41	1.05	
1127	Pokemon Battle Revolution	Wii	2006	Role-Playing	Nintendo	0.80	0.38	0.30	
2083	Xenoblade Chronicles	Wii	2010	Role-Playing	Nintendo	0.49	0.26	0.16	
2126	Dragon Quest X	Wii	2012	Role-Playing	Square Enix	0.00	0.00	0.96	
2818	Dragon Quest Swords: The Masked Queen and the ...	Wii	2007	Role-Playing	Square Enix	0.18	0.01	0.50	
2934	The Last Story	Wii	2011	Role-Playing	Nintendo	0.32	0.13	0.18	
3234	Muramasa: The Demon Blade	Wii	2009	Role-Playing	Rising Star Games	0.33	0.13	0.11	
3698	Tales of Symphonia: Dawn of the New World	Wii	2008	Role-Playing	Namco Bandai Games	0.22	0.05	0.24	
4110	Dragon Quest 25 Shuunen Kinin: Famicom & Super...	Wii	2011	Role-Playing	Square Enix	0.00	0.00	0.47	
4679	Marvel: Ultimate Alliance	Wii	2006	Role-Playing	Activision	0.37	0.01	0.00	
4826	Rune Factory: Frontier	Wii	2008	Role-Playing	Rising Star Games	0.18	0.14	0.04	
4915	Fragile Dreams: Farewell Ruins of the Moon	Wii	2009	Role-Playing	Rising Star Games	0.17	0.12	0.06	
5362	Pandora's Tower	Wii	2011	Role-Playing	Nintendo	0.13	0.10	0.08	
5380	Marvel: Ultimate Alliance 2	Wii	2009	Role-Playing	Activision	0.26	0.05	0.00	
5575	Monster Lab	Wii	2008	Role-Playing	Eidos Interactive	0.28	0.02	0.00	
6380	Inazuma Eleven Strikers	Wii	2011	Role-Playing	Nintendo	0.00	0.01	0.25	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
6386	Final Fantasy Crystal Chronicles: Echoes of Time	Wii	2009	Role-Playing	Square Enix	0.13	0.06	0.05	
6633	Monster Hunter G	Wii	2009	Role-Playing	Capcom	0.00	0.00	0.25	
7102	Tales of Graces	Wii	2009	Role-Playing	Namco Bandai Games	0.00	0.00	0.22	
7202	Final Fantasy Fables: Chocobo's Dungeon	Wii	2007	Role-Playing	Square Enix	0.09	0.00	0.11	
7341	Rune Factory: Tides of Destiny	Wii	2011	Role-Playing	Marvelous Interactive	0.14	0.00	0.06	
7423	Spectrobes: Origins	Wii	2009	Role-Playing	Disney Interactive Studios	0.16	0.02	0.00	
7563	Shiren the Wanderer	Wii	2008	Role-Playing	Sega	0.08	0.00	0.11	
7616	Arc Rise Fantasia	Wii	2009	Role-Playing	Marvelous Interactive	0.13	0.00	0.06	
7709	Inazuma Eleven Strikers 2012 Xtreme	Wii	2011	Role-Playing	Level 5	0.00	0.00	0.19	
9017	Valhalla Knights: Eldar Saga	Wii	2009	Role-Playing	Rising Star Games	0.10	0.01	0.01	
9176	Dokapon Kingdom	Wii	2008	Role-Playing	Sting	0.12	0.00	0.00	
9214	Phantom Brave: We Meet Again	Wii	2009	Role-Playing	Nippon Ichi Software	0.12	0.00	0.01	
9876	Sakura Wars: So Long, My Love	Wii	2010	Role-Playing	Ackkstudios	0.06	0.04	0.00	
10355	Inazuma Eleven GO Strikers 2013	Wii	2012	Role-Playing	Level 5	0.00	0.00	0.10	
10434	Opoona	Wii	2007	Role-Playing	Tecmo Koei	0.08	0.00	0.01	
11509	Baroque	Wii	2008	Role-Playing	Rising Star Games	0.07	0.00	0.00	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
12141	Alien Syndrome	Wii	2007	Role-Playing	Sega	0.06	0.00	0.00	
14123	Eyeshield 21: Field Saikyou no Senshi Tachi	Wii	2007	Role-Playing	Nintendo	0.00	0.00	0.03	
15283	Earth Seeker	Wii	2011	Role-Playing	Kadokawa Shoten	0.00	0.00	0.02	

In [79]: *# Both statement need to evaluate to true*

```
data.loc[(data["Platform"] == "Wii") & (data["Genre"] == "Role-Playing")].so
```

Out[79]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Ot
709	Monster Hunter Tri	Wii	2009	Role-Playing	Nintendo	0.67	0.41	1.05	
1127	Pokemon Battle Revolution	Wii	2006	Role-Playing	Nintendo	0.80	0.38	0.30	
2083	Xenoblade Chronicles	Wii	2010	Role-Playing	Nintendo	0.49	0.26	0.16	
2126	Dragon Quest X	Wii	2012	Role-Playing	Square Enix	0.00	0.00	0.96	
2818	Dragon Quest Swords: The Masked Queen and the ...	Wii	2007	Role-Playing	Square Enix	0.18	0.01	0.50	
2934	The Last Story	Wii	2011	Role-Playing	Nintendo	0.32	0.13	0.18	
3234	Muramasa: The Demon Blade	Wii	2009	Role-Playing	Rising Star Games	0.33	0.13	0.11	
3698	Tales of Symphonia: Dawn of the New World	Wii	2008	Role-Playing	Namco Bandai Games	0.22	0.05	0.24	
4110	Dragon Quest 25 Shuunen Kinin: Famicom & Super...	Wii	2011	Role-Playing	Square Enix	0.00	0.00	0.47	
4679	Marvel: Ultimate Alliance	Wii	2006	Role-Playing	Activision	0.37	0.01	0.00	
4826	Rune Factory: Frontier	Wii	2008	Role-Playing	Rising Star Games	0.18	0.14	0.04	
4915	Fragile Dreams: Farewell Ruins of the Moon	Wii	2009	Role-Playing	Rising Star Games	0.17	0.12	0.06	
5362	Pandora's Tower	Wii	2011	Role-Playing	Nintendo	0.13	0.10	0.08	
5380	Marvel: Ultimate Alliance 2	Wii	2009	Role-Playing	Activision	0.26	0.05	0.00	
5575	Monster Lab	Wii	2008	Role-Playing	Eidos Interactive	0.28	0.02	0.00	
6380	Inazuma Eleven Strikers	Wii	2011	Role-Playing	Nintendo	0.00	0.01	0.25	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
6386	Final Fantasy Crystal Chronicles: Echoes of Time	Wii	2009	Role-Playing	Square Enix	0.13	0.06	0.05	
6633	Monster Hunter G	Wii	2009	Role-Playing	Capcom	0.00	0.00	0.25	
7102	Tales of Graces	Wii	2009	Role-Playing	Namco Bandai Games	0.00	0.00	0.22	
7341	Rune Factory: Tides of Destiny	Wii	2011	Role-Playing	Marvelous Interactive	0.14	0.00	0.06	
7202	Final Fantasy Fables: Chocobo's Dungeon	Wii	2007	Role-Playing	Square Enix	0.09	0.00	0.11	
7423	Spectrobes: Origins	Wii	2009	Role-Playing	Disney Interactive Studios	0.16	0.02	0.00	
7563	Shiren the Wanderer	Wii	2008	Role-Playing	Sega	0.08	0.00	0.11	
7616	Arc Rise Fantasia	Wii	2009	Role-Playing	Marvelous Interactive	0.13	0.00	0.06	
7709	Inazuma Eleven Strikers 2012 Xtreme	Wii	2011	Role-Playing	Level 5	0.00	0.00	0.19	
9017	Valhalla Knights: Eldar Saga	Wii	2009	Role-Playing	Rising Star Games	0.10	0.01	0.01	
9214	Phantom Brave: We Meet Again	Wii	2009	Role-Playing	Nippon Ichi Software	0.12	0.00	0.01	
9176	Dokapon Kingdom	Wii	2008	Role-Playing	Sting	0.12	0.00	0.00	
9876	Sakura Wars: So Long, My Love	Wii	2010	Role-Playing	Ackkstudios	0.06	0.04	0.00	
10355	Inazuma Eleven GO Strikers 2013	Wii	2012	Role-Playing	Level 5	0.00	0.00	0.10	
10434	Opoona	Wii	2007	Role-Playing	Tecmo Koei	0.08	0.00	0.01	
11509	Baroque	Wii	2008	Role-Playing	Rising Star Games	0.07	0.00	0.00	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
12141	Alien Syndrome	Wii	2007	Role-Playing	Sega	0.06	0.00	0.00	
14123	Eyeshield 21: Field Saikyou no Senshi Tachi	Wii	2007	Role-Playing	Nintendo	0.00	0.00	0.03	
15283	Earth Seeker	Wii	2011	Role-Playing	Kadokawa Shoten	0.00	0.00	0.02	

```
In [81]: rpg = data["Genre"] == "Role-Playing"
```

```
In [82]: data.loc[wii & rpg]
```

Out[82]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Ot
709	Monster Hunter Tri	Wii	2009	Role-Playing	Nintendo	0.67	0.41	1.05	
1127	Pokemon Battle Revolution	Wii	2006	Role-Playing	Nintendo	0.80	0.38	0.30	
2083	Xenoblade Chronicles	Wii	2010	Role-Playing	Nintendo	0.49	0.26	0.16	
2126	Dragon Quest X	Wii	2012	Role-Playing	Square Enix	0.00	0.00	0.96	
2818	Dragon Quest Swords: The Masked Queen and the ...	Wii	2007	Role-Playing	Square Enix	0.18	0.01	0.50	
2934	The Last Story	Wii	2011	Role-Playing	Nintendo	0.32	0.13	0.18	
3234	Muramasa: The Demon Blade	Wii	2009	Role-Playing	Rising Star Games	0.33	0.13	0.11	
3698	Tales of Symphonia: Dawn of the New World	Wii	2008	Role-Playing	Namco Bandai Games	0.22	0.05	0.24	
4110	Dragon Quest 25 Shuunen Kinin: Famicom & Super...	Wii	2011	Role-Playing	Square Enix	0.00	0.00	0.47	
4679	Marvel: Ultimate Alliance	Wii	2006	Role-Playing	Activision	0.37	0.01	0.00	
4826	Rune Factory: Frontier	Wii	2008	Role-Playing	Rising Star Games	0.18	0.14	0.04	
4915	Fragile Dreams: Farewell Ruins of the Moon	Wii	2009	Role-Playing	Rising Star Games	0.17	0.12	0.06	
5362	Pandora's Tower	Wii	2011	Role-Playing	Nintendo	0.13	0.10	0.08	
5380	Marvel: Ultimate Alliance 2	Wii	2009	Role-Playing	Activision	0.26	0.05	0.00	
5575	Monster Lab	Wii	2008	Role-Playing	Eidos Interactive	0.28	0.02	0.00	
6380	Inazuma Eleven Strikers	Wii	2011	Role-Playing	Nintendo	0.00	0.01	0.25	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
6386	Final Fantasy Crystal Chronicles: Echoes of Time	Wii	2009	Role-Playing	Square Enix	0.13	0.06	0.05	
6633	Monster Hunter G	Wii	2009	Role-Playing	Capcom	0.00	0.00	0.25	
7102	Tales of Graces	Wii	2009	Role-Playing	Namco Bandai Games	0.00	0.00	0.22	
7202	Final Fantasy Fables: Chocobo's Dungeon	Wii	2007	Role-Playing	Square Enix	0.09	0.00	0.11	
7341	Rune Factory: Tides of Destiny	Wii	2011	Role-Playing	Marvelous Interactive	0.14	0.00	0.06	
7423	Spectrobes: Origins	Wii	2009	Role-Playing	Disney Interactive Studios	0.16	0.02	0.00	
7563	Shiren the Wanderer	Wii	2008	Role-Playing	Sega	0.08	0.00	0.11	
7616	Arc Rise Fantasia	Wii	2009	Role-Playing	Marvelous Interactive	0.13	0.00	0.06	
7709	Inazuma Eleven Strikers 2012 Xtreme	Wii	2011	Role-Playing	Level 5	0.00	0.00	0.19	
9017	Valhalla Knights: Eldar Saga	Wii	2009	Role-Playing	Rising Star Games	0.10	0.01	0.01	
9176	Dokapon Kingdom	Wii	2008	Role-Playing	Sting	0.12	0.00	0.00	
9214	Phantom Brave: We Meet Again	Wii	2009	Role-Playing	Nippon Ichi Software	0.12	0.00	0.01	
9876	Sakura Wars: So Long, My Love	Wii	2010	Role-Playing	Ackkstudios	0.06	0.04	0.00	
10355	Inazuma Eleven GO Strikers 2013	Wii	2012	Role-Playing	Level 5	0.00	0.00	0.10	
10434	Opoona	Wii	2007	Role-Playing	Tecmo Koei	0.08	0.00	0.01	
11509	Baroque	Wii	2008	Role-Playing	Rising Star Games	0.07	0.00	0.00	

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
12141		Alien Syndrome	Wii	2007	Role-Playing	Sega	0.06	0.00	0.00	
14123		Eyeshield 21: Field Saikyou no Senshi Tachi	Wii	2007	Role-Playing	Nintendo	0.00	0.00	0.03	
15283		Earth Seeker	Wii	2011	Role-Playing	Kadokawa Shoten	0.00	0.00	0.02	

In [83]:

```
# Filter with OR
# Or needs at least one condition to be true

action = data["Genre"] == "Action"
shooter = data["Genre"] == "Shooter"

data.loc[action | shooter]
```

Out[83]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
9		Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	
16		Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	
17		Grand Theft Auto: San Andreas	PS2	2004	Action	Take-Two Interactive	9.43	0.40	0.41	
23		Grand Theft Auto V	X360	2013	Action	Take-Two Interactive	9.63	5.31	0.06	
24		Grand Theft Auto: Vice City	PS2	2002	Action	Take-Two Interactive	8.41	5.49	0.47	
...
16275		Planet Monsters	GBA	2001	Action	Titus	0.01	0.00	0.00	
16276		Carmageddon 64	N64	1999	Action	Virgin Interactive	0.01	0.00	0.00	
16278		Breach	PC	2011	Shooter	Destineer	0.01	0.00	0.00	
16282		Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...	PSV	2016	Action	dramatic create	0.00	0.00	0.01	
16287		Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	

4533 rows × 10 columns

In [85]:

```
# Filter with both OR and AND condition

since_2010 = data["Year"] >= 2010
```

```
data.loc[(since_2010) & (action | shooter)]
```

Out[85]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
16	Grand Theft Auto V		PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	
23	Grand Theft Auto V		X360	2013	Action	Take-Two Interactive	9.63	5.31	0.06	
29	Call of Duty: Modern Warfare 3		X360	2011	Shooter	Activision	9.03	4.28	0.13	
31	Call of Duty: Black Ops		X360	2010	Shooter	Activision	9.67	3.73	0.11	
33	Call of Duty: Black Ops 3		PS4	2015	Shooter	Activision	5.77	5.81	0.35	
...										
16244	God Eater Off Shot: Tachibana Sakuya-hen Twin ...		PS4	2016	Action	Namco Bandai Games	0.00	0.00	0.01	
16260	Fujiko F. Fujio Characters: Great Assembly! SI...		3DS	2014	Action	Namco Bandai Games	0.00	0.00	0.01	
16262	Resident Evil 4 HD		XOne	2016	Shooter	Capcom	0.01	0.00	0.00	
16278	Breach		PC	2011	Shooter	Destineer	0.01	0.00	0.00	
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...		PSV	2016	Action	dramatic create	0.00	0.00	0.01	

1833 rows × 10 columns

```
In [87]: data.loc[since_2010 & action | shooter]
```

Out[87]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Ot
9	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	
16	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	
23	Grand Theft Auto V	X360	2013	Action	Take-Two Interactive	9.63	5.31	0.06	
29	Call of Duty: Modern Warfare 3	X360	2011	Shooter	Activision	9.03	4.28	0.13	
31	Call of Duty: Black Ops	X360	2010	Shooter	Activision	9.67	3.73	0.11	
...
16262	Resident Evil 4 HD	XOne	2016	Shooter	Capcom	0.01	0.00	0.00	
16270	Damnation	PC	2009	Shooter	Codemasters	0.00	0.01	0.00	
16278	Breach	PC	2011	Shooter	Destineer	0.01	0.00	0.00	
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...	PSV	2016	Action	dramatic create	0.00	0.00	0.01	
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00	

2720 rows × 10 columns

In [88]:

```
# isin()
top_3_publishers = data.Publisher.isin(["Electronic Arts", "Activision", "Nar
```

In [89]:

```
data.loc[top_3_publishers]
```

Out [89]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	O
29	Call of Duty: Modern Warfare 3		X360	2011	Shooter	Activision	9.03	4.28	0.13	
31	Call of Duty: Black Ops		X360	2010	Shooter	Activision	9.67	3.73	0.11	
33	Call of Duty: Black Ops 3		PS4	2015	Shooter	Activision	5.77	5.81	0.35	
34	Call of Duty: Black Ops II		PS3	2012	Shooter	Activision	4.99	5.88	0.65	
35	Call of Duty: Black Ops II		X360	2012	Shooter	Activision	8.25	4.30	0.07	
...
16234	Spore Galactic Adventures		PC	2009	Strategy	Electronic Arts	0.00	0.01	0.00	
16244	God Eater Off Shot: Tachibana Sakuya-hen Twin ...		PS4	2016	Action	Namco Bandai Games	0.00	0.00	0.01	
16247	Psychic Detective		PS	1995	Adventure	Electronic Arts	0.01	0.00	0.00	
16260	Fujiko F. Fujio Characters: Great Assembly! Sl...		3DS	2014	Action	Namco Bandai Games	0.00	0.00	0.01	
16288	SCORE International Baja 1000: The Official Game		PS2	2008	Racing	Activision	0.00	0.00	0.00	

3233 rows × 10 columns

In [90]:

```
genres = data.Genre.isin(["Sports", "Action", "Shooter"])
sales_2M = data["Global Sales"] >= 2
```

In [92]:

```
data.loc[genres & top_3_publishers & sales_2M]
```

Out[92]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sal
29	Call of Duty: Modern Warfare 3	X360	2011	Shooter	Activision	9.03	4.28	0.13	1.
31	Call of Duty: Black Ops	X360	2010	Shooter	Activision	9.67	3.73	0.11	1.
33	Call of Duty: Black Ops 3	PS4	2015	Shooter	Activision	5.77	5.81	0.35	2.
34	Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65	2.
35	Call of Duty: Black Ops II	X360	2012	Shooter	Activision	8.25	4.30	0.07	1.
...									
826	Madden NFL 15	PS4	2014	Sports	Electronic Arts	1.53	0.25	0.00	0.
829	NBA Live 2004	PS2	2003	Sports	Electronic Arts	1.57	0.18	0.00	0.
830	Dead Space	PS3	2008	Action	Electronic Arts	1.05	0.67	0.00	0.
831	Call of Duty 2	X360	2005	Shooter	Activision	1.81	0.05	0.01	0.
832	Madden NFL 15	X360	2014	Sports	Electronic Arts	1.76	0.09	0.00	0.

130 rows × 10 columns

In [96]:

```
# between allows us to specify a range
between_2M_10M = data["Global Sales"].between(2,10)

y_90s = data["Year"].between(1990,1999)
y_00s = data["Year"].between(2000,2009)
y_10s = data["Year"].between(2010,2019)
```

In [97]:

```
data.loc[between_2M_10M & y_90s, "Genre"]
```

```
Out[97]: 63      Racing
66      Role-Playing
69      Racing
71      Platform
76      Racing
...
796     Strategy
808     Racing
817     Sports
827     Sports
839     Fighting
Name: Genre, Length: 126, dtype: object
```

```
In [98]: data.loc[between_2M_10M & y_90s, "Genre"].value_counts(normalize=True)
```

```
Out[98]: Genre
Platform      0.198413
Action        0.166667
Racing         0.119048
Role-Playing   0.095238
Fighting       0.095238
Shooter        0.063492
Strategy       0.063492
Misc           0.063492
Sports          0.055556
Simulation     0.031746
Adventure      0.031746
Puzzle          0.015873
Name: proportion, dtype: float64
```

```
In [99]: data.loc[between_2M_10M & y_00s, "Genre"].value_counts(normalize=True)
```

```
Out[99]: Genre
Action        0.205263
Sports         0.134211
Role-Playing   0.113158
Shooter        0.105263
Misc           0.105263
Platform       0.086842
Racing         0.084211
Fighting       0.063158
Simulation     0.052632
Puzzle          0.031579
Adventure      0.010526
Strategy       0.007895
Name: proportion, dtype: float64
```

```
In [100...]: data.loc[between_2M_10M & y_10s, "Genre"].value_counts(normalize=True)
```

```
Out[100]: Genre
Action        0.253112
Shooter       0.190871
Sports         0.190871
Role-Playing   0.120332
Misc           0.082988
Platform       0.049793
Racing         0.041494
Simulation     0.029046
Fighting       0.020747
Adventure      0.012448
Strategy       0.004149
Puzzle          0.004149
Name: proportion, dtype: float64
```

In [101]: `data.loc[~data["Genre"].isin(["Puzzle", "Strategy", "Adventure"])]`

Out[101]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16285	Plushees	DS	2008	Simulation	Destineer	0.01	0.00	0.00
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

13777 rows × 10 columns

In [102]: `data.loc[~data["Genre"].isin(["Puzzle", "Strategy", "Adventure"])] & y_10s`

Out[102]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
15	Kinect Adventures!		X360	2010	Misc	Microsoft Game Studios	14.97	4.94	0.24
16	Grand Theft Auto V		PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
23	Grand Theft Auto V		X360	2013	Action	Take-Two Interactive	9.63	5.31	0.06
26	Pokemon Black/Pokemon White		DS	2010	Role-Playing	Nintendo	5.57	3.28	5.65
29	Call of Duty: Modern Warfare 3		X360	2011	Shooter	Activision	9.03	4.28	0.13
...
16269	Rugby Challenge 3		XOne	2016	Sports	Alternative Software	0.00	0.01	0.00
16271	Outdoors Unleashed: Africa 3D		3DS	2011	Sports	Mastiff	0.01	0.00	0.00
16274	Fit & Fun		Wii	2011	Sports	Unknown	0.00	0.01	0.00
16278	Breach		PC	2011	Shooter	Destineer	0.01	0.00	0.00
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...		PSV	2016	Action	dramatic create	0.00	0.00	0.01

4309 rows × 10 columns

In [103...]

```
# Let's find out which Racing Games had the highest sales in EU compared to
# between the years 2000-2009

racing = data["Genre"] == "Racing"
highest_EU = (data["EU_Sales"] > data["JP_Sales"]) & (data["EU_Sales"] > data["NA_Sales"])
y_00s = data["Year"].between(2000, 2009)
```

In [104...]

```
data.loc[racing & highest_EU & y_00s, ["Name", "EU_Sales"]].sort_values(by="EU_Sales", ascending=False)
```

Out [104]:

	Name	EU_Sales
113	Need for Speed Underground 2	3.02
223	The Simpsons: Hit & Run	2.19
271	Gran Turismo 5 Prologue	1.83
308	MotorStorm	1.61
411	Gran Turismo (PSP)	1.59
...
15948	FlatOut: Ultimate Carnage	0.01
16008	Full Auto 2: Battlelines	0.01
16052	Juiced 2: Hot Import Nights	0.01
16073	Colin McRae Rally 04	0.01
16106	Sega Rally Revo	0.01

103 rows × 2 columns

Most Useful Methods for Data Analysis

In [105...]

```
# query()  
data.query("NA_Sales < JP_Sales")
```

Out [105]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_S
26	Pokemon Black/Pokemon White		DS	2010	Role-Playing	Nintendo	5.57	3.28	
27	Brain Age 2: More Training in Minutes a Day		DS	2005	Puzzle	Nintendo	3.44	5.36	
41	Animal Crossing: Wild World		DS	2005	Simulation	Nintendo	2.55	3.52	
66	Final Fantasy VII		PS	1997	Role-Playing	Sony Computer Entertainment	3.01	2.47	
73	Animal Crossing: New Leaf		3DS	2012	Simulation	Nintendo	2.01	2.32	
...
16268	Neo Angelique Special		PSP	2008	Adventure	Tecmo Koei	0.00	0.00	
16273	Real Rode		PS2	2008	Adventure	Kadokawa Shoten	0.00	0.00	
16280	Mezase!! Tsuru Master DS		DS	2009	Sports	Hudson Soft	0.00	0.00	
16282	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...		PSV	2016	Action	dramatic create	0.00	0.00	
16283	Eiyuu Densetsu: Sora no Kiseki Material Collec...		PSP	2007	Role-Playing	Falcom Corporation	0.00	0.00	

4078 rows × 10 columns

In [107...]: `data.query("Publisher == 'Ubisoft' and Year > 2014")`

Out[107]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	C
350	Tom Clancy's The Division	PS4	2016		Shooter	Ubisoft	1.28	1.61	0.15	
407	Assassin's Creed Syndicate	PS4	2015		Action	Ubisoft	0.80	1.92	0.06	
749	Tom Clancy's Rainbow Six: Siege	PS4	2015		Shooter	Ubisoft	0.54	1.16	0.13	
761	Far Cry: Primal	PS4	2016		Action	Ubisoft	0.59	1.16	0.06	
835	Tom Clancy's The Division	XOne	2016		Shooter	Ubisoft	1.20	0.62	0.00	
1515	Tom Clancy's Rainbow Six: Siege	XOne	2015		Shooter	Ubisoft	0.73	0.44	0.00	
1527	Assassin's Creed Syndicate	XOne	2015		Action	Ubisoft	0.61	0.56	0.00	
1651	Just Dance 2016	Wii	2015		Misc	Ubisoft	0.52	0.59	0.00	
2400	Far Cry: Primal	XOne	2016		Action	Ubisoft	0.46	0.32	0.00	
3391	Just Dance 2016	WiiU	2015		Misc	Ubisoft	0.28	0.25	0.00	
5026	Tom Clancy's The Division	PC	2016		Shooter	Ubisoft	0.20	0.14	0.00	
5144	Just Dance 2016	X360	2015		Misc	Ubisoft	0.23	0.10	0.00	
5261	Just Dance 2016	PS4	2015		Misc	Ubisoft	0.16	0.13	0.00	
5535	TrackMania Turbo	PS4	2016		Action	Ubisoft	0.03	0.24	0.00	
5601	Just Dance 2016	XOne	2015		Misc	Ubisoft	0.24	0.04	0.00	
5860	Imagine: Makeup Artist	DS	2020	Simulation		Ubisoft	0.27	0.00	0.00	
6630	Anno 2205	PC	2015		Strategy	Ubisoft	0.02	0.22	0.00	
7086	Tom Clancy's Rainbow Six: Siege	PC	2015		Shooter	Ubisoft	0.12	0.08	0.00	
7132	Just Dance	PS3	2015		Misc	Ubisoft	0.10	0.08	0.00	

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	C
2016										
7428	Assassin's Creed Syndicate		PC	2015	Action	Ubisoft	0.10	0.08	0.00	
9085	Far Cry: Primal		PC	2016	Action	Ubisoft	0.04	0.09	0.00	
9303	Hasbro Family Fun Pack		XOne	2015	Misc	Ubisoft	0.10	0.02	0.00	
9719	Assassin's Creed Chronicles		PSV	2016	Action	Ubisoft	0.02	0.06	0.01	
10698	The Crew: Wild Run		PS4	2015	Action	Ubisoft	0.00	0.08	0.00	
11014	Might & Magic Heroes VII		PC	2015	Strategy	Ubisoft	0.00	0.08	0.00	
11347	Just Dance: Disney Party 2		WiiU	2015	Action	Ubisoft	0.06	0.01	0.00	
11375	Assassin's Creed Chronicles		PS4	2016	Action	Ubisoft	0.01	0.05	0.01	
11657	Just Dance: Disney Party 2		X360	2015	Action	Ubisoft	0.05	0.01	0.00	
11663	Rugby World Cup 2015		PS3	2015	Sports	Ubisoft	0.00	0.06	0.00	
11834	Assassin's Creed: Rogue		PC	2015	Action	Ubisoft	0.04	0.02	0.00	
11863	Toy Soldiers: War Chest		PS4	2015	Action	Ubisoft	0.06	0.00	0.00	
11904	Just Dance: Disney Party 2		XOne	2015	Action	Ubisoft	0.05	0.01	0.00	
12356	TrackMania Turbo		XOne	2016	Action	Ubisoft	0.02	0.03	0.00	
12500	Rugby World Cup 2015		PS4	2015	Sports	Ubisoft	0.00	0.05	0.00	
12693	ZombiU		PS4	2016	Action	Ubisoft	0.00	0.04	0.01	
12725	Toy Soldiers: War Chest		XOne	2015	Action	Ubisoft	0.05	0.00	0.00	
13153	Rugby World Cup		X360	2015	Sports	Ubisoft	0.00	0.04	0.00	

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	C
2015									
13416	Gravity Falls: Legend of the Gnome Gemulets	3DS	2015	Action	Ubisoft	0.03	0.00	0.00	0.00
13727	Rugby World Cup 2015	PSV	2015	Sports	Ubisoft	0.00	0.03	0.00	0.00
13837	Assassin's Creed Chronicles: China	PS4	2015	Action	Ubisoft	0.00	0.03	0.00	0.00
14884	Rugby World Cup 2015	XOne	2015	Sports	Ubisoft	0.00	0.02	0.00	0.00
15296	The Crew: Wild Run	PC	2015	Action	Ubisoft	0.00	0.02	0.00	0.00
15334	The Crew: Wild Run	XOne	2015	Action	Ubisoft	0.00	0.02	0.00	0.00
16084	TrackMania Turbo	PC	2016	Action	Ubisoft	0.00	0.01	0.00	0.00
16145	Assassin's Creed Chronicles	XOne	2016	Action	Ubisoft	0.00	0.01	0.00	0.00
16156	Rugby World Cup 2015	PC	2015	Sports	Ubisoft	0.00	0.01	0.00	0.00

In [108...]: ps3 = data.query("Platform == 'PS3'")

In [109...]: ps3

Out[109]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
16		Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	
34		Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	
37		Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	
40		Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	
54		Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	
...
16147		Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	
16148		Shin Koihime Musou: Otome Taisen * Sangokushi ...	PS3	2014	Adventure	Views	0.00	0.00	
16177		Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	
16216		Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	
16236		Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	

1304 rows × 10 columns

In [110]: # unique() and nunique()

data.Platform.unique()

Out[110]: array(['Wii', 'NES', 'GB', 'DS', 'X360', 'PS3', 'PS2', 'SNES', 'GBA', '3DS', 'PS4', 'N64', 'PS', 'XB', 'PC', '2600', 'PSP', 'XOne', 'GC', 'WiiU', 'GEN', 'DC', 'PSV', 'SAT', 'SCD', 'WS', 'NG', 'TG16', '3DO', 'GG', 'PCFX'], dtype=object)

In [111]: data.Platform.nunique()

Out[111]: 31

In [113]: data.nunique()

Out[113]:

```
In [114]: data["Year"].nunique()
```

```
Out[114]: 39
```

```
In [117]: for i in data.select_dtypes("object"):
    print(data[i].unique())
```

['Wii Sports' 'Super Mario Bros.' 'Mario Kart Wii' ... 'Plushees'
 'Woody Woodpecker in Crazy Castle 5' 'Know How 2']
 ['Wii' 'NES' 'GB' 'DS' 'X360' 'PS3' 'PS2' 'SNES' 'GBA' '3DS' 'PS4' 'N64'
 'PS' 'XB' 'PC' '2600' 'PSP' 'XOne' 'GC' 'WiiU' 'GEN' 'DC' 'PSV' 'SAT'
 'SCD' 'WS' 'NG' 'TG16' '3DO' 'GG' 'PCFX']
 ['Sports' 'Platform' 'Racing' 'Role-Playing' 'Puzzle' 'Misc' 'Shooter'
 'Simulation' 'Action' 'Fighting' 'Adventure' 'Strategy']
 ['Nintendo' 'Microsoft Game Studios' 'Take-Two Interactive'
 'Sony Computer Entertainment' 'Activision' 'Ubisoft' 'Bethesda Softworks'
 'Electronic Arts' 'Sega' 'SquareSoft' 'Atari' '505 Games' 'Capcom'
 'GT Interactive' 'Konami Digital Entertainment'
 'Sony Computer Entertainment Europe' 'Square Enix' 'LucasArts'
 'Virgin Interactive' 'Warner Bros. Interactive Entertainment'
 'Universal Interactive' 'Eidos Interactive' 'RedOctane' 'Vivendi Games'
 'Enix Corporation' 'Namco Bandai Games' 'Palcom' 'Hasbro Interactive'
 'THQ' 'Fox Interactive' 'Acclaim Entertainment' 'MTV Games'
 'Disney Interactive Studios' 'Majesco Entertainment' 'Codemasters'
 'Red Orb' 'Level 5' 'Arena Entertainment' 'Midway Games' 'JVC'
 'Deep Silver' '989 Studios' 'NCSoft' 'UEP Systems' 'Parker Bros.' 'Maxis'
 'Imagic' 'Tecmo Koei' 'Valve Software' 'ASCII Entertainment' 'Mindscape'
 'Infogrames' 'Unknown' 'Square' 'Valve' 'Activision Value' 'Banpresto'
 'D3Publisher' 'Oxygen Interactive' 'Red Storm Entertainment'
 'Video System' 'Hello Games' 'Global Star' 'Gotham Games'
 'Westwood Studios' 'GungHo' 'Crave Entertainment' 'Hudson Soft' 'Coleco'
 'Rising Star Games' 'Atlus' 'TDK Mediactive' 'ASC Games' 'Zoo Games'
 'Accolade' 'Sony Online Entertainment' '3DO' 'RTL' 'Natsume'
 'Focus Home Interactive' 'Alchemist' 'Black Label Games'
 'SouthPeak Games' 'Mastertronic' 'Ocean' 'Zoo Digital Publishing'
 'Psygnosis' 'City Interactive' 'Empire Interactive' 'Success' 'Compile'
 'Russel' 'Taito' 'Agetec' 'GSP' 'Microprose' 'Play It'
 'Slightly Mad Studios' 'Tomy Corporation' 'Sammy Corporation'
 'Koch Media' 'Game Factory' 'Titus' 'Marvelous Entertainment' 'Genki'
 'Mojang' 'Pinnacle' 'CTO SpA' 'TalonSoft' 'Crystal Dynamics' 'SCi'
 'Quelle' 'mixi, Inc' 'Rage Software' 'Ubisoft Annecy' 'Scholastic Inc.'
 'Interplay' 'Mystique' 'ChunSoft' 'Square EA'
 '20th Century Fox Video Games' 'Avanquest Software'
 'Hudson Entertainment' 'Nordic Games' 'Men-A-Vision' 'Nobilis'
 'Big Ben Interactive' 'Touchstone' 'Spike' 'Jester Interactive'
 'Nippon Ichi Software' 'LEGO Media' 'Quest' 'Illusion Softworks'
 'Tigervision' 'Funbox Media' 'Rocket Company' 'Metro 3D'
 'Mattel Interactive' 'IE Institute' 'Rondomedia'
 'Sony Computer Entertainment America' 'Universal Gamedex' 'Ghostlight'
 'Wizard Video Games' 'BMG Interactive Entertainment' 'PQube'
 'Trion Worlds' 'Laguna' 'Ignition Entertainment' 'Takara'
 'Kadokawa Shoten' 'Destineer' 'Enterbrain' 'Xseed Games' 'Imagineer'
 'System 3 Arcade Software' 'CPG Products' 'Aruze Corp' 'Gamebridge'
 'Midas Interactive Entertainment' 'Jaleco' 'Answer Software' 'XS Games'
 'Activision Blizzard' 'Pack In Soft' 'Rebellion' 'Xplosiv'
 'GameMill Entertainment' 'Wanadoo' 'NovaLogic' 'Telltale Games' 'Epoch'
 'BAM! Entertainment' 'Knowledge Adventure' 'Mastiff' 'Tetris Online'
 'Harmonix Music Systems' 'ESP' 'TYO' 'Telegames' 'Mud Duck Productions'
 'Screenlife' 'Pioneer LDC' 'Magical Company' 'Mentor Interactive' 'Kemco'
 'Human Entertainment' 'Avanquest' 'Data Age' 'Electronic Arts Victor'
 'Black Bean Games' 'Jack of All Games' '989 Sports' 'Takara Tomy'
 'Media Rings' 'Elf' 'Starfish' 'Zushi Games' 'Jorudan'
 'Destination Software, Inc' 'New' 'Brash Entertainment'
 'ITT Family Games' 'PopCap Games' 'Home Entertainment Suppliers'
 'Ackkstudios' 'Starpath Corp.' 'P2 Games' 'BPS' 'Gathering of Developers'
 'NewKidCo' 'Storm City Games' 'CokeM Interactive' 'CBS Electronics'
 'Magix' 'Marvelous Interactive' 'Kalypso Media'
 'Nihon Falcom Corporation' 'Wargaming.net' 'Angel Studios'
 'Arc System Works' 'Playmates' 'SNK Playmore' 'Hamster Corporation'
 'From Software' 'Nippon Columbia' 'Nichibutsu' 'Little Orbit'
 'Conspiracy Entertainment' 'DTP Entertainment' 'Hect' 'Mumbo Jumbo'

'Pacific Century Cyber Works' 'Indie Games' 'Liquid Games' 'NEC' 'Axela' 'ArtDink' 'Sunsoft' 'Gust' 'SNK' 'NEC Interchannel' 'FuRyu' 'Xing Entertainment' 'ValuSoft' 'Victor Interactive' 'Detn8 Games' 'American Softworks' 'Nordcurrent' 'Bomb' 'Falcom Corporation' 'AQ Interactive' 'CCP' 'Milestone S.r.l.' 'JoWood Productions' 'Seta Corporation' 'On Demand' 'NCS' 'Aspyr' 'Gremlin Interactive Ltd' 'Agatsuma Entertainment' 'Compile Heart' 'Culture Brain' 'Mad Catz' 'Shogakukan' 'Merscom LLC' 'Rebellion Developments' 'Nippon Telenet' 'TDK Core' 'bitComposer Games' 'Foreign Media Games' 'Astragon' 'SSI' 'Kadokawa Games' 'Idea Factory' 'Performance Designed Products' 'Asylum Entertainment' 'Core Design Ltd.' 'PlayV' 'UFO Interactive' 'Idea Factory International' 'Playlogic Game Factory' 'Essential Games' 'Adeline Software' 'Funcom' 'Panther Software' 'Blast! Entertainment Ltd' 'Game Life' 'DSI Games' 'Avalon Interactive' 'Popcorn Arcade' 'Neko Entertainment' 'Vir2L Studios' 'Aques' 'Syscom' 'White Park Bay Software' 'System 3' 'Vatical Entertainment' 'Daedalic' 'EA Games' 'Media Factory' 'Vic Tokai' 'The Adventure Company' 'Game Arts' 'Broccoli' 'Acquire' 'General Entertainment' 'Excalibur Publishing' 'Imadio' 'Swing! Entertainment' 'Sony Music Entertainment' 'Aqua Plus' 'Paradox Interactive' 'Hip Interactive' 'DreamCatcher Interactive' 'Tripwire Interactive' 'Sting' 'Yacht Club Games' 'SCS Software' 'Bigben Interactive' 'Havas Interactive' 'Slitherine Software' 'Graffiti' 'Funsta' 'Telstar' 'U.S. Gold' 'DreamWorks Interactive' 'Data Design Interactive' 'MT0' 'DHM Interactive' 'FunSoft' 'SPS' 'Bohemia Interactive' 'Reef Entertainment' 'Tru Blu Entertainment' 'Moss' 'T&E Soft' '0-Games' 'Aksys Games' 'NDA Productions' 'Data East' 'Time Warner Interactive' 'Gainax Network Systems' 'Daito' '03 Entertainment' 'Gameloft' 'Xicat Interactive' 'Simon & Schuster Interactive' 'Valcon Games' 'PopTop Software' 'TOHO' 'HMH Interactive' '5pb' 'Cave' 'CDV Software Entertainment' 'Microids' 'PM Studios' 'Paon' 'Micro Cabin' 'GameTek' 'Benesse' 'Type-Moon' 'Enjoy Gaming ltd.' 'Asmik Corp' 'Interplay Productions' 'Asmik Ace Entertainment' 'inXile Entertainment' 'Image Epoch' 'Phantom EFX' 'Evolved Games' 'responDESIGN' 'Culture Publishers' 'Griffin International' 'Hackberry' 'Hearty Robin' 'Nippon Amuse' 'Origin Systems' 'Seventh Chord' 'Mitsui' 'Milestone' 'Abylight' 'Flight-Plan' 'Glams' 'Locus' 'Warp' 'Daedalic Entertainment' 'Alternative Software' 'Myelin Media' 'Mercury Games' 'Irem Software Engineering' 'Sunrise Interactive' 'Elite' 'Evolution Games' 'Tivola' 'Global A Entertainment' 'Edia' 'Athena' 'Aria' 'Gamecock' 'Tommo' 'Altron' 'Happinet' 'iWin' 'Media Works' 'Fortyfive' 'Revolution Software' 'Imax' 'Crimson Cow' '10TACLE Studios' 'Groove Games' 'Pack-In-Video' 'Insomniac Games' 'Ascaron Entertainment GmbH' 'Asgard' 'Ecole' 'Yumedia' 'Phenomedia' 'HAL Laboratory' 'Grand Prix Games' 'DigiCube' 'Creative Core' 'Kaga Create' 'WayForward Technologies' 'LSP Games' 'ASCII Media Works' 'Coconuts Japan' 'Arika' 'Ertain' 'Marvel Entertainment' 'Prototype' 'Phantagram' '1C Company' 'The Learning Company' 'TechnoSoft' 'Vap' 'Misawa' 'Tradewest' 'Team17 Software' 'Yeti' 'Pow' 'Navarre Corp' 'MediaQuest' 'Max Five' 'Comfort' 'Monte Christo Multimedia' 'Pony Canyon' 'Riverhillsoft' 'Summitsoft' 'Milestone S.r.l.' 'Playmore' 'MLB.com' 'Kool Kizz' 'Flashpoint Games' '49Games' 'Legacy Interactive' 'Alawar Entertainment' 'CyberFront' 'Cloud Imperium Games Corporation' 'Societa' 'Virtual Play Games' 'Interchannel' 'Sonnet' 'Experience Inc.' 'Zenrin' 'Iceberg Interactive' 'Ivolgamus' '2D Boy' 'MC2 Entertainment' 'Kando Games' 'Just Flight' 'Office Create' 'Mamba Games' 'Fields' 'Princess Soft' 'Maximum Family Games' 'Berkeley' 'Fuji' 'Dusenberry Martin Racing' 'imageepoch Inc.' 'Big Fish Games' 'Her Interactive' 'Kamui' 'ASK' 'TopWare Interactive' 'Headup Games' 'KSS' 'Cygames' 'KID' 'Quinrose' 'Sunflowers' 'dramatic create' 'TGL' 'Encore' 'Extreme Entertainment Group' 'Intergrow' 'G.Rev' 'Sweets' 'Kokopeli Digital Studios' 'Number None' 'Nexon' 'id Software' 'BushiRoad' 'Tryfirst' 'Strategy First' '7G//AMES' 'GN Software' "Yuke's" 'Easy Interactive' 'Licensed 4U' 'FuRyu Corporation'

'Lexicon Entertainment' 'Paon Corporation' 'Kids Station' 'GOA'
 'Graphsim Entertainment' 'King Records' 'Introversion Software'
 'Minato Station' 'Devolver Digital' 'Blue Byte' 'Gaga'
 'Yamasa Entertainment' 'Plenty' 'Views' 'fonfun' 'NetRevo'
 'Codemasters Online' 'Quintet' 'Phoenix Games' 'Dorart' 'Marvelous Games'
 'Focus Multimedia' 'Imageworks' 'Karin Entertainment' 'Aerosoft'
 'Technos Japan Corporation' 'Gakken' 'Mirai Shounen' 'Datam Polystar'
 'Saurus' 'HuneX' 'Revolution (Japan)' 'Giza10' 'Visco' 'Alvion' 'Mycom'
 'Giga' 'Warashi' 'System Soft' 'Sold Out' 'Lighthouse Interactive'
 'Masque Publishing' 'RED Entertainment' 'Michaelsoft'
 'Media Entertainment' 'New World Computing' 'Genterprise'
 'Interworks Unlimited, Inc.' 'Boost On' 'Stainless Games'
 'EON Digital Entertainment' 'Epic Games' 'Naxat Soft'
 'Ascaron Entertainment' 'Piacci' 'Nitroplus' 'Paradox Development'
 'Otomate' 'Ongakukan' 'Commseed' 'Inti Creates' 'Takuyo'
 'Interchannel-Holon' 'Rain Games' 'UIG Entertainment']

In [118]: # rename and set index

ps3

Out[118]:

		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
	16	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	
	34	Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	
	37	Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	
	40	Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	
	54	Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	

	16147	Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	
	16148	Shin Koihime Musou: Otome Taisen * Sangokushi ...	PS3	2014	Adventure	Views	0.00	0.00	
	16177	Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	
	16216	Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	
	16236	Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	

1304 rows × 10 columns

In [119]: # rename and set index

ps3.reset_index()

Out [119]:

	index	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales
0	16	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.21
1	34	Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88
2	37	Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.81
3	40	Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44
4	54	Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88
...
1299	16147	Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.00
1300	16148	Shin Koihime Musou: Otome Taisen * Sangokushi ...	PS3	2014	Adventure	Views	0.00	0.00
1301	16177	Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00
1302	16216	Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00
1303	16236	Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00

1304 rows × 11 columns

In [120...]

#reset_index and rename and set index

ps3.reset_index(drop=True, inplace=True)

In [121...]

ps3

Out[121]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	1
1	Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	1
2	Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	1
3	Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	1
4	Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	1
...
1299	Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	1
1300	Shin Koihime Musou: Otome Taisen * Sangokushi ...	PS3	2014	Adventure	Views	0.00	0.00	1
1301	Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	1
1302	Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	1
1303	Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	1

1304 rows × 10 columns

In [122... ps3.set_index("Name")

Out[122]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [123...]

ps3

Out [123]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	1
1	Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	1
2	Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	1
3	Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	1
4	Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	1
...
1299	Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	1
1300	Shin Koihime Musou: Otome Taisen * Sangokushi ...	PS3	2014	Adventure	Views	0.00	0.00	1
1301	Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	1
1302	Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	1
1303	Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	1

1304 rows × 10 columns

In [124...]: ps3.set_index("Name", inplace=True)

In [125...]: ps3

Out [125]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [126...]: ps3.rename({"EU_Sales": "Europe", "NA_Sales": "North America"})

Out[126]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [127...]: ps3.rename({"EU_Sales": "Europe", "NA_Sales": "North America"}, axis=1)

Out [127]:

	Platform	Year	Genre	Publisher	North America	Europe	JP_Sales	Oth
Name								
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65	
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49	
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48	
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81	
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00	
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01	
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01	
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01	
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01	

1304 rows × 9 columns

In [128...]

ps3

Out [128]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Name							
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [129...]: ps3.rename({"Call of Duty: Black Ops II": "COD Black OPS 2"})

Out [129]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Name							
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
COD Black OPS 2	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [130...]: ps3.rename({"Call of Duty: Black Ops II": "COD Black OPS 2"}, axis=0)

Out[130]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Name							
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
COD Black OPS 2	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [131... `#nlargest and nsmallest`In [133... `ps3.nlargest(n=10, columns="NA_Sales")`

Out[133]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_S
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97	
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48	
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49	
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65	
Call of Duty: Modern Warfare 2	PS3	2009	Shooter	Activision	4.99	3.69	0.38	
Grand Theft Auto IV	PS3	2008	Action	Take-Two Interactive	4.76	3.76	0.44	
Call of Duty: Ghosts	PS3	2013	Shooter	Activision	4.09	3.73	0.38	
Uncharted 2: Among Thieves	PS3	2009	Action	Sony Computer Entertainment	3.27	2.25	0.21	
Call of Duty 4: Modern Warfare	PS3	2007	Shooter	Activision	3.10	2.30	0.28	
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81	

In [134...]

ps3.nlargest(n=10, columns="NA_Sales").loc[:, "NA_Sales"]

Out[134]:

Name	NA_Sales
Grand Theft Auto V	7.01
Call of Duty: Black Ops	5.98
Call of Duty: Modern Warfare 3	5.54
Call of Duty: Black Ops II	4.99
Call of Duty: Modern Warfare 2	4.99
Grand Theft Auto IV	4.76
Call of Duty: Ghosts	4.09
Uncharted 2: Among Thieves	3.27
Call of Duty 4: Modern Warfare	3.10
Gran Turismo 5	2.96

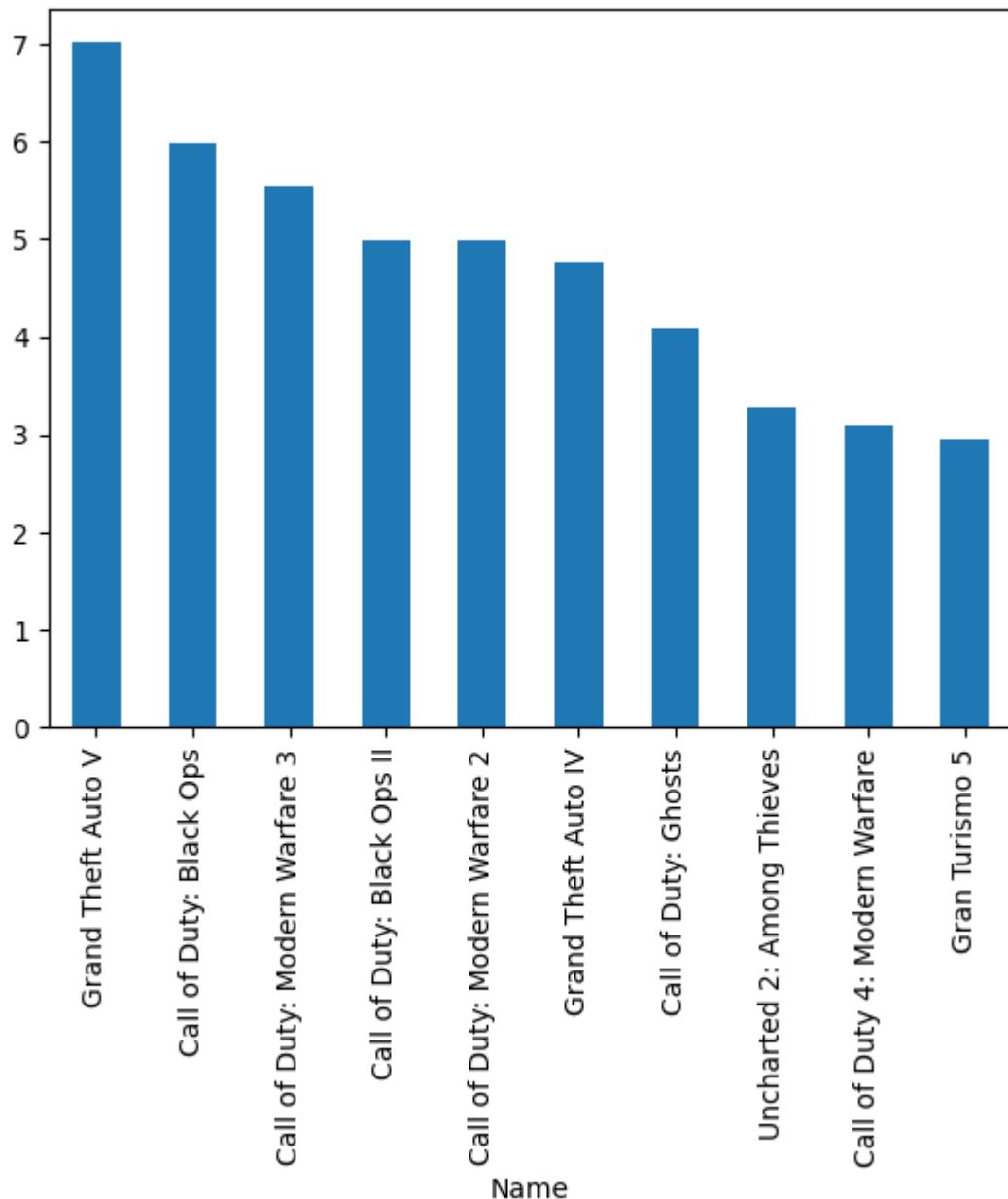
Name: NA_Sales, dtype: float64

In [135...]

ps3.nlargest(n=10, columns="NA_Sales").loc[:, "NA_Sales"].plot.bar()

Out[135]:

<Axes: xlabel='Name'>

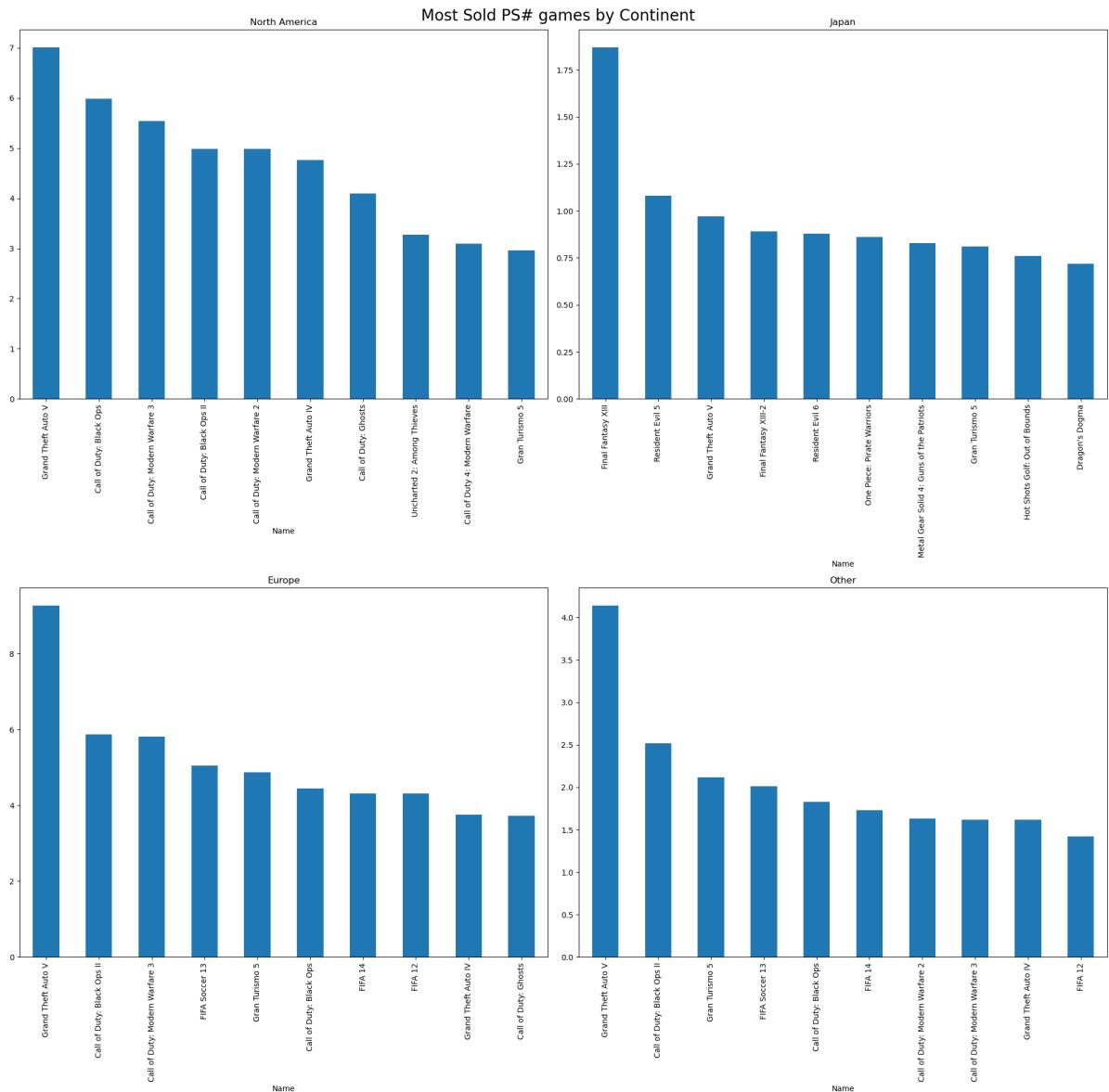


```
In [137]: fig, ax = plt.subplots(2,2, figsize=(20,20))

ps3.nlargest(n=10, columns="NA_Sales").loc[:, "NA_Sales"].plot.bar(ax=ax[0][0])
ax[0][0].set_title("North America")
ps3.nlargest(n=10, columns="JP_Sales").loc[:, "JP_Sales"].plot.bar(ax=ax[0][1])
ax[0][1].set_title("Japan")
ps3.nlargest(n=10, columns="EU_Sales").loc[:, "EU_Sales"].plot.bar(ax=ax[1][0])
ax[1][0].set_title("Europe")
ps3.nlargest(n=10, columns="Other_Sales").loc[:, "Other_Sales"].plot.bar(ax=ax[1][1])
ax[1][1].set_title("Other")

fig.suptitle("Most Sold PS# games by Continent", fontsize=20)
fig.tight_layout()
```

Top Game Publisher



```
In [141]: fig.savefig("ps3_sales.TIFF", transparent=True)
```

```
In [142]: ps3.nsmallest(n=5, columns="Global Sales")
```

Out[142]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Oth
Name								
Nobunaga no Yabou Online: Houou no Shou	PS3	2012	Strategy	Ackkstudios	0.00	0.0	0.01	
Utawarerumono: Futari no Hakuoro	PS3	2016	Misc	Aqua Plus	0.00	0.0	0.01	
Pro Angler Moves	PS3	2012	Sports	Interworks Unlimited, Inc.	0.01	0.0	0.00	
The Legend of Heroes: Trails in the Sky Third Chapter	PS3	2013	Role-Playing	Falcom Corporation	0.00	0.0	0.01	
Higurashi no Naku Koro ni Iki	PS3	2015	Action	Kaga Create	0.00	0.0	0.01	

In [143...]

```
# value_counts()
top_100 = ps3.nlargest(n=100, columns="Global Sales")
```

In [144...]

```
top_100["Genre"].value_counts()
```

Out[144]:

Genre	
Action	30
Shooter	20
Sports	19
Racing	10
Role-Playing	8
Platform	3
Misc	3
Adventure	3
Fighting	3
Simulation	1

Name: count, dtype: int64

In [145...]

```
top_100["Genre"].value_counts(normalize=True)
```

Out[145]:

Genre	
Action	0.30
Shooter	0.20
Sports	0.19
Racing	0.10
Role-Playing	0.08
Platform	0.03
Misc	0.03
Adventure	0.03
Fighting	0.03
Simulation	0.01

Name: proportion, dtype: float64

In [146...]

```
top_100["Genre"].value_counts(normalize=True, ascending=False)
```

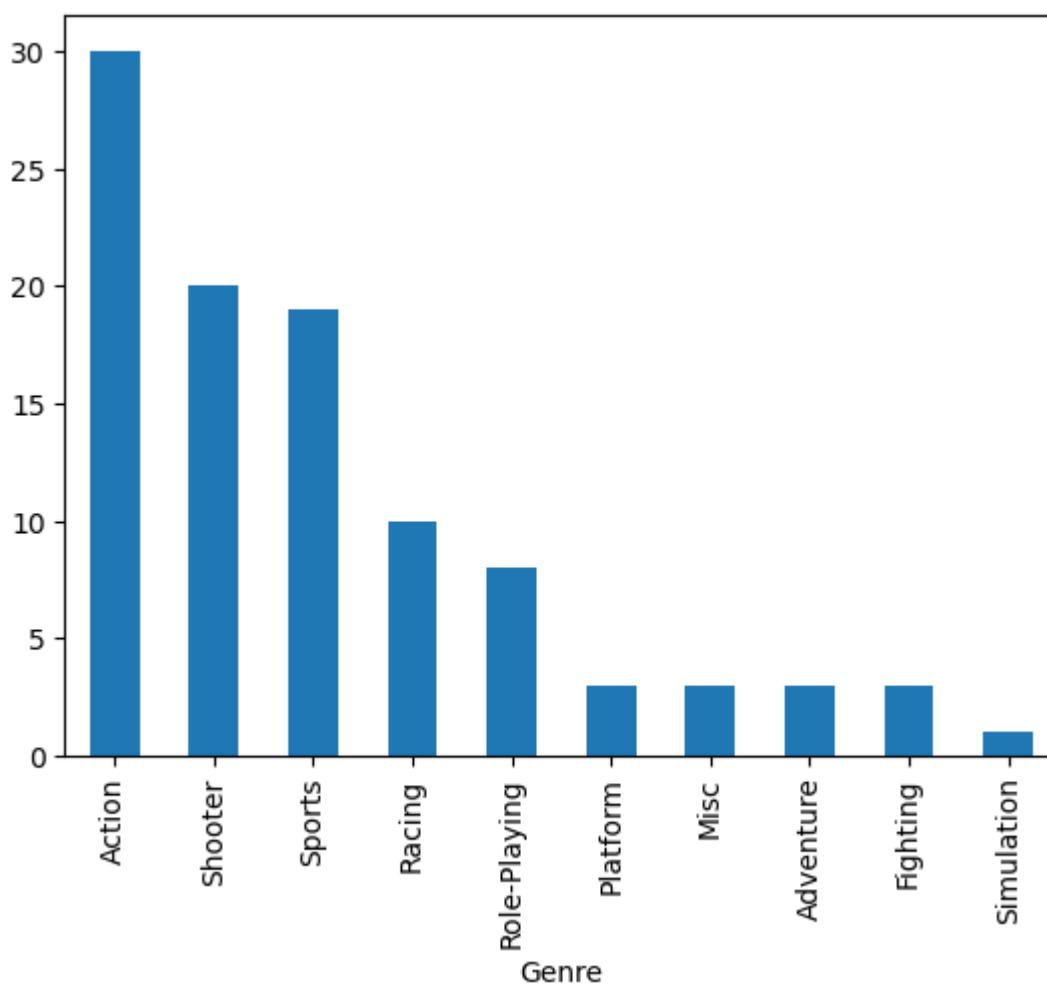
```
Out[146]: Genre
Action      0.30
Shooter     0.20
Sports       0.19
Racing       0.10
Role-Playing 0.08
Platform     0.03
Misc         0.03
Adventure    0.03
Fighting     0.03
Simulation   0.01
Name: proportion, dtype: float64
```

```
In [147... top_100["Genre"].value_counts(normalize=True, ascending=True)
```

```
Out[147]: Genre
Simulation  0.01
Platform    0.03
Misc        0.03
Adventure   0.03
Fighting    0.03
Role-Playing 0.08
Racing      0.10
Sports       0.19
Shooter     0.20
Action      0.30
Name: proportion, dtype: float64
```

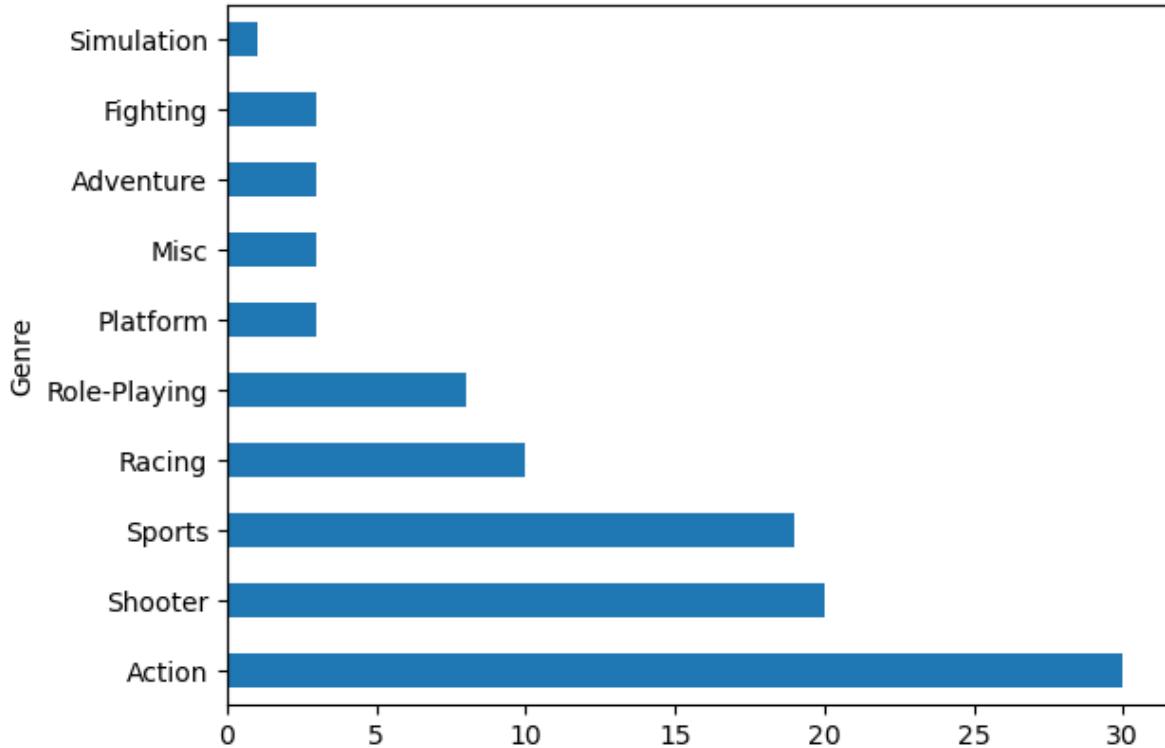
```
In [148... top_100["Genre"].value_counts().plot.bar()
```

```
Out[148]: <Axes: xlabel='Genre'>
```



```
In [149]: top_100["Genre"].value_counts().plot.barh()
```

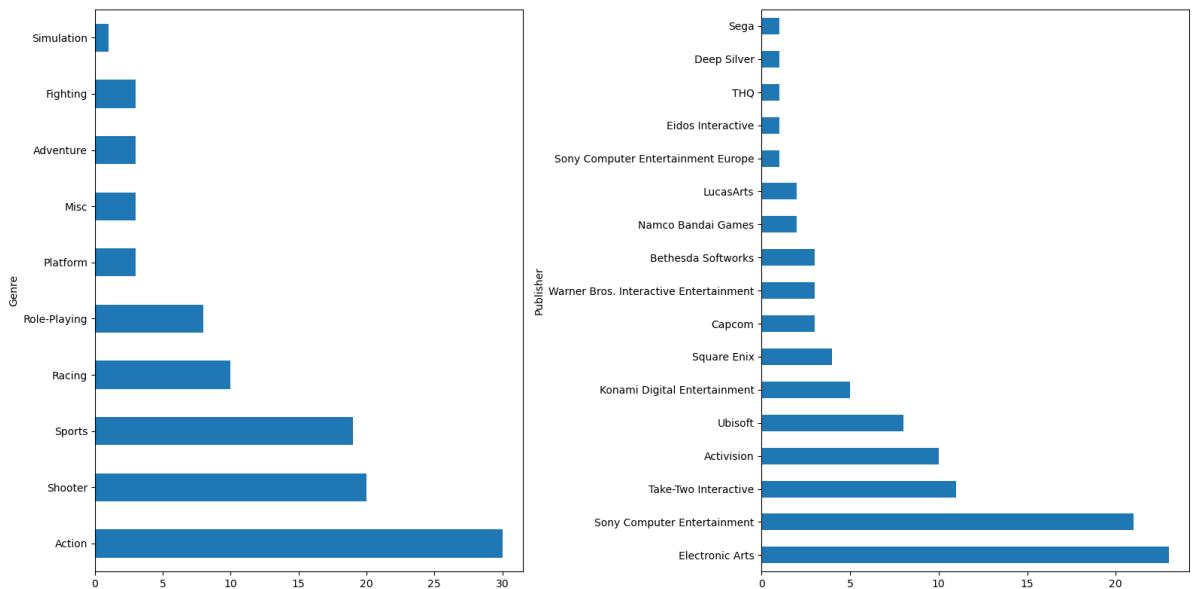
Out[149]: <Axes: ylabel='Genre'>



```
In [151]: fig, ax = plt.subplots(1,2,figsize=(16,8))
```

```
top_100["Genre"].value_counts().plot.barh(ax=ax[0])
top_100["Publisher"].value_counts().plot.barh(ax=ax[1])
```

```
plt.tight_layout()
```



```
In [152]: # sort_values
```

```
ps3
```

Out [152]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Grand Theft Auto V	PS3	2013	Action	Take-Two Interactive	7.01	9.27	0.97
Call of Duty: Black Ops II	PS3	2012	Shooter	Activision	4.99	5.88	0.65
Call of Duty: Modern Warfare 3	PS3	2011	Shooter	Activision	5.54	5.82	0.49
Call of Duty: Black Ops	PS3	2010	Shooter	Activision	5.98	4.44	0.48
Gran Turismo 5	PS3	2010	Racing	Sony Computer Entertainment	2.96	4.88	0.81
...
Hyperdimension Neptunia mk2	PS3	2011	Action	Nippon Ichi Software	0.00	0.01	0.00
Shin Koihime Musou: Otome Taisen * Sangokushi Engi	PS3	2014	Adventure	Views	0.00	0.00	0.01
Muv-Luv Alternative	PS3	2012	Simulation	5pb	0.00	0.00	0.01
Akatsuki no Goei Trinity	PS3	2012	Adventure	5pb	0.00	0.00	0.01
Battle Fantasia	PS3	2008	Fighting	505 Games	0.00	0.00	0.01

1304 rows × 9 columns

In [154...]: ps3.sort_values(by="Genre", ascending=False)

Out [154]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_
Name								
Sid Meier's Civilization Revolution	PS3	2008	Strategy	Take-Two Interactive	0.49	0.19	0.01	
Nobunaga no Yabou Online: Houou no Shou	PS3	2012	Strategy	Ackkstudios	0.00	0.00	0.01	
Plants vs. Zombies	PS3	2011	Strategy	PopCap Games	0.18	0.00	0.00	
Tom Clancy's EndWar	PS3	2008	Strategy	Ubisoft	0.32	0.22	0.01	
Nobunaga no Yabou: Souzou	PS3	2013	Strategy	Tecmo Koei	0.00	0.00	0.19	
...
The Golden Compass	PS3	2007	Action	Sega	0.14	0.10	0.00	
Siren: Blood Curse	PS3	2008	Action	Sony Computer Entertainment	0.00	0.17	0.09	
Shadows of the Damned	PS3	2011	Action	Electronic Arts	0.11	0.09	0.04	
The Adventures of Tintin: The Game	PS3	2011	Action	Ubisoft	0.06	0.16	0.00	
Family Guy: Back to the Multiverse	PS3	2012	Action	Activision	0.12	0.12	0.00	

1304 rows × 9 columns

In [155...]

ps3.sort_values(by="Year", ascending=False)

Out [155]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
Name								
TV Anime Idolm@ster: Cinderella Girls G4U! Pack Vol.8	PS3	2016	Misc	Namco Bandai Games	0.00	0.00	0.02	
Dragon Quest Builders: Revive Alefgard	PS3	2016	Role- Playing	Square Enix	0.00	0.00	0.12	
Jikkyou Powerful Pro Baseball 2016	PS3	2016	Sports	Konami Digital Entertainment	0.00	0.00	0.11	
Rugby Challenge 3	PS3	2016	Sports	Alternative Software	0.00	0.04	0.00	
UEFA Euro 2016	PS3	2016	Sports	Konami Digital Entertainment	0.00	0.08	0.02	
...
Need for Speed Carbon	PS3	2006	Racing	Electronic Arts	0.49	0.52	0.03	
Mobile Suit Gundam: Crossfire	PS3	2006	Simulation	Namco Bandai Games	0.06	0.00	0.14	
Fight Night Round 3	PS3	2006	Fighting	Electronic Arts	0.81	0.59	0.01	
Resident Evil Director's Cut	PS3	2006	Action	Capcom	0.00	0.00	0.04	
Armored Core 4	PS3	2006	Simulation	505 Games	0.09	0.00	0.09	

1304 rows × 9 columns

In [156...]

ps3.sort_values(by="Year", ascending=True)

Out[156]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Name							
Blazing Angels: Squadrons of WWII	PS3	2006	Simulation	Ubisoft	0.35	0.22	0.00
NBA 2K7	PS3	2006	Sports	Take-Two Interactive	0.30	0.04	0.00
Genji: Days of the Blade	PS3	2006	Action	Sony Computer Entertainment	0.18	0.38	0.06
Resistance: Fall of Man	PS3	2006	Shooter	Sony Computer Entertainment	1.73	1.73	0.14
Tiger Woods PGA Tour 07	PS3	2006	Sports	Electronic Arts	0.31	0.12	0.00
...
Utawarerumono: Futari no Hakuoro	PS3	2016	Misc	Aqua Plus	0.00	0.00	0.01
Sengoku Basara: Sanada Yukimura-Den	PS3	2016	Action	Capcom	0.00	0.00	0.02
Nobunaga's Ambition: Sphere of Influence - Sengoku Rishiden	PS3	2016	Misc	Tecmo Koei	0.00	0.00	0.03
FIFA 17	PS3	2016	Sports	Electronic Arts	0.02	0.29	0.01
UEFA Euro 2016	PS3	2016	Sports	Konami Digital Entertainment	0.00	0.08	0.02

1304 rows × 9 columns

In [157...]: ps3.sort_values(by=["Year", "Global Sales"])

Out [157]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
Sega Golf Club: Miyazato San Kyoudai Naizou	PS3	2006	Sports	Sega	0.00	0.00	0.01	
Mahjong Taikai IV	PS3	2006	Misc	Tecmo Koei	0.00	0.00	0.01	
Railfan	PS3	2006	Simulation	Ongakukan	0.00	0.00	0.01	
Mahjong Kakutou Club: Zenkoku Taisenban	PS3	2006	Misc	Konami Digital Entertainment	0.00	0.00	0.03	
Resident Evil Director's Cut	PS3	2006	Action	Capcom	0.00	0.00	0.04	
...
Yakuza Kiwami	PS3	2016	Adventure	Sega	0.00	0.00	0.12	
Dragon Quest Heroes II: Twin Kings and the Prophecy's End	PS3	2016	Action	Square Enix	0.00	0.00	0.13	
MLB 16: The Show	PS3	2016	Action	Sony Computer Entertainment	0.13	0.00	0.00	
LEGO Marvel's Avengers	PS3	2016	Action	Warner Bros. Interactive Entertainment	0.10	0.17	0.00	
FIFA 17	PS3	2016	Sports	Electronic Arts	0.02	0.29	0.01	

1304 rows × 9 columns

In [158...]

ps3.sort_values(by=["Year", "Global Sales"], ascending=False)

Out [158]:

Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
FIFA 17	PS3	2016	Sports	Electronic Arts	0.02	0.29	0.01	
LEGO Marvel's Avengers	PS3	2016	Action	Warner Bros. Interactive Entertainment	0.10	0.17	0.00	
MLB 16: The Show	PS3	2016	Action	Sony Computer Entertainment	0.13	0.00	0.00	
Dragon Quest Heroes II: Twin Kings and the Prophecy's End	PS3	2016	Action	Square Enix	0.00	0.00	0.13	
Lego Star Wars: The Force Awakens	PS3	2016	Action	Warner Bros. Interactive Entertainment	0.03	0.07	0.00	
...
Resident Evil Director's Cut	PS3	2006	Action	Capcom	0.00	0.00	0.04	
Mahjong Kakutou Club: Zenkoku Taisenban	PS3	2006	Misc	Konami Digital Entertainment	0.00	0.00	0.03	
Sega Golf Club: Miyazato San Kyoudai Naizou	PS3	2006	Sports	Sega	0.00	0.00	0.01	
Mahjong Taikai IV	PS3	2006	Misc	Tecmo Koei	0.00	0.00	0.01	
Railfan	PS3	2006	Simulation	Ongakukan	0.00	0.00	0.01	

1304 rows × 9 columns

In [159...]: ps3.sort_values(by=["Year", "Global Sales"], ascending=[True, False])

Out [159]:

	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
Name							
Resistance: Fall of Man	PS3	2006	Shooter	Sony Computer Entertainment	1.73	1.73	0.14
MotorStorm	PS3	2006	Racing	Sony Computer Entertainment	1.53	1.61	0.06
Fight Night Round 3	PS3	2006	Fighting	Electronic Arts	0.81	0.59	0.01
Call of Duty 3	PS3	2006	Shooter	Activision	0.60	0.63	0.03
Ridge Racer 7	PS3	2006	Racing	Namco Bandai Games	0.24	0.70	0.16
...
TV Anime Idolm@ster: Cinderella Girls G4U! Pack Vol.8	PS3	2016	Misc	Namco Bandai Games	0.00	0.00	0.02
Call of Duty: Modern Warfare Trilogy	PS3	2016	Shooter	Activision	0.00	0.01	0.00
Toukiden 2	PS3	2016	Action	Tecmo Koei	0.00	0.00	0.02
Utawarerumono: Futari no Hakuoro	PS3	2016	Misc	Aqua Plus	0.00	0.00	0.01
Batman: A Telltale Game Series	PS3	2016	Adventure	Telltale Games	0.00	0.01	0.00

1304 rows × 9 columns

In [162...]

```
# agfuncs + agg() & cumsum()

print("Min Year:", data.Year.min())
print("Max Year:", data.Year.max())
print("Mean Year:", data.Year.mean())
print("Median Year:", data.Year.median())
print("std Year:", data.Year.std())
print("Count number of rows in Year:", data.Year.count())
print("Sum of EU_Sales Year:", data.EU_Sales.sum())
print("Mode Name", data.Name.mode()[0])
```

Min Year: 1980
 Max Year: 2020
 Mean Year: 2006.4055613528942
 Median Year: 2007.0
 std Year: 5.8324122195220385
 Count number of rows in Year: 16291
 Sum of EU_Sales Year: 2406.69
 Mode Name Need for Speed: Most Wanted

In [163...]

```
data.Name.mode()[0]
```

```
Out[163]: 'Need for Speed: Most Wanted'
```

```
In [164... data["Global Sales"].quantile(0.8)
```

```
Out[164]: 0.61
```

```
In [165... data["Global Sales"].quantile(0.99)
```

```
Out[165]: 5.472000000000007
```

```
In [166... data.EU_Sales.agg(["min", "max", "mean", "median", "std", "sum", "count"])
```

```
Out[166]: min           0.000000
max          29.020000
mean         0.147731
median       0.020000
std          0.509303
sum         2406.690000
count      16291.000000
Name: EU_Sales, dtype: float64
```

```
In [167... data.EU_Sales.cumsum()
```

```
Out[167]: 0            29.02
1            32.60
2            45.48
3            56.49
4            65.38
...
16286      2406.68
16287      2406.68
16288      2406.68
16289      2406.69
16290      2406.69
Name: EU_Sales, Length: 16291, dtype: float64
```

```
In [169... xbox_sales = data.loc[data.Platform == "XB", ["NA_Sales", "Year"]].groupby("
```

```
In [170... xbox_sales
```

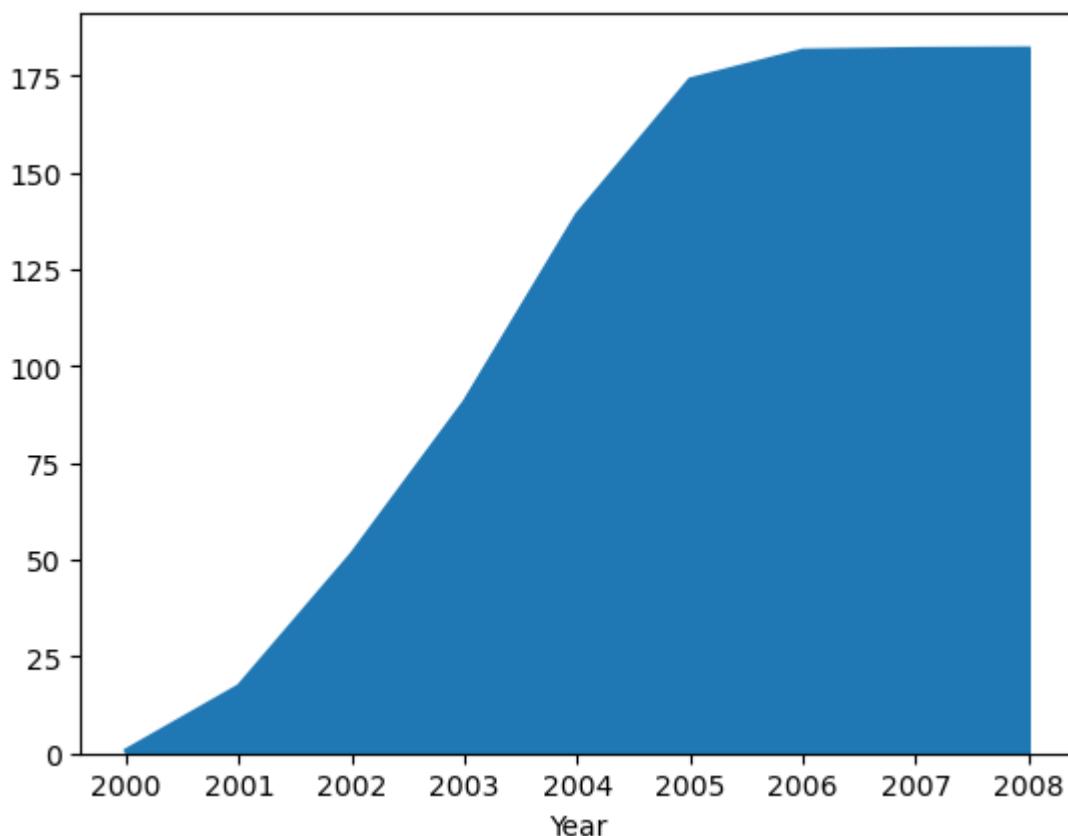
```
Out[170]: Year
2000     0.74
2001    16.61
2002    34.05
2003    39.34
2004    48.47
2005    34.84
2006     7.47
2007     0.41
2008     0.13
Name: NA_Sales, dtype: float64
```

```
In [171... xbox_sales.cumsum()
```

```
Out[171]: Year
2000      0.74
2001     17.35
2002     51.40
2003    90.74
2004   139.21
2005   174.05
2006   181.52
2007   181.93
2008   182.06
Name: NA_Sales, dtype: float64
```

```
In [172... xbox_sales.cumsum().plot.area()
```

```
Out[172]: <Axes: xlabel='Year'>
```



```
In [173... # qut and qcut
# cut
pd.cut(x = data["Year"], bins=5)
```

```
Out[173]: 0      (2004.0, 2012.0]
1      (1979.96, 1988.0]
2      (2004.0, 2012.0]
3      (2004.0, 2012.0]
4      (1988.0, 1996.0]
...
16286     (1996.0, 2004.0]
16287     (1996.0, 2004.0]
16288     (2004.0, 2012.0]
16289     (2004.0, 2012.0]
16290     (1996.0, 2004.0]
Name: Year, Length: 16291, dtype: category
Categories (5, interval[float64, right]): [(1979.96, 1988.0] < (1988.0, 1996.0] < (1996.0, 2004.0] < (2004.0, 2012.0] < (2012.0, 2020.0]]
```

```
In [174... pd.cut(x = data["Year"], bins=5).value_counts()
```

```
Out[174]: Year
(2004.0, 2012.0]    9052
(1996.0, 2004.0]    4185
(2012.0, 2020.0]    2086
(1988.0, 1996.0]    780
(1979.96, 1988.0]   188
Name: count, dtype: int64
```

```
In [176... pd.cut(x = data["Year"], bins=[1980, 1989, 1999, 2009, 2019])
```

```
Out[176]: 0      (1999, 2009]
1      (1980, 1989]
2      (1999, 2009]
3      (1999, 2009]
4      (1989, 1999]
...
16286     (1999, 2009]
16287     (1999, 2009]
16288     (1999, 2009]
16289     (2009, 2019]
16290     (1999, 2009]
Name: Year, Length: 16291, dtype: category
Categories (4, interval[int64, right]): [(1980, 1989] < (1989, 1999] < (1999, 2009] < (2009, 2019)]
```

```
In [177... pd.cut(x = data["Year"], bins=[1980, 1989, 1999, 2009, 2019]).value_counts()
```

```
Out[177]: Year
(1999, 2009]    9183
(2009, 2019]    5133
(1989, 1999]    1769
(1980, 1989]    196
Name: count, dtype: int64
```

```
In [178... pd.cut(x = data["Year"], bins=[1980, 1989, 1999, 2009, 2019], labels=["80s", "90s", "00s", "10s"])
```

```
Out[178]: 0      00s
1      80s
2      00s
3      00s
4      90s
...
16286     00s
16287     00s
16288     00s
16289     10s
16290     00s
Name: Year, Length: 16291, dtype: category
Categories (4, object): ['80s' < '90s' < '00s' < '10s']
```

```
In [179... pd.cut(x = data["Year"], bins=[1980, 1989, 1999, 2009, 2019], labels=["80s", "90s", "00s", "10s"], right=False)
```

```
Out[179]: Year
00s    9183
10s    5133
90s    1769
80s    196
Name: count, dtype: int64
```

```
In [356... data["Decade"] = pd.cut(data["Year"], bins=[1980, 1989, 1999, 2009, 2019], right=False)
```

```
In [190... data
```

Out[190]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 11 columns

In [191...]

qcut

pd.qcut(x=data["Year"], q=4)

Out[191]:

```

0      (2003.0, 2007.0]
1      (1979.999, 2003.0]
2      (2007.0, 2010.0]
3      (2007.0, 2010.0]
4      (1979.999, 2003.0]

...
16286    (1979.999, 2003.0]
16287    (1979.999, 2003.0]
16288    (2007.0, 2010.0]
16289    (2007.0, 2010.0]
16290    (1979.999, 2003.0]
Name: Year, Length: 16291, dtype: category
Categories (4, interval[float64, right]): [(1979.999, 2003.0] < (2003.0, 2007.0] < (2007.0, 2010.0] < (2010.0, 2020.0]]

```

In [192...]

pd.qcut(x=data["Year"], q=4).value_counts()

```
Out[192]: Year
(1979.999, 2003.0]    4409
(2007.0, 2010.0]      4116
(2003.0, 2007.0]      3889
(2010.0, 2020.0]      3877
Name: count, dtype: int64
```

```
In [193... pd.qcut(x=data["Global Sales"], q=4).value_counts()
```

```
Out[193]: Global Sales
(0.009000000000000001, 0.06]    4266
(0.17, 0.48]                    4039
(0.48, 82.74]                  4023
(0.06, 0.17]                    3963
Name: count, dtype: int64
```

```
In [194... pd.qcut(x=data["Global Sales"], q=4,precision=50).value_counts()
```

```
Out[194]: Global Sales
(0.01, 0.06]    4266
(0.17, 0.48]    4039
(0.48, 82.74]   4023
(0.06, 0.17]    3963
Name: count, dtype: int64
```

```
In [195... pd.qcut(x=data["Global Sales"], q=[0,0.5,0.75,0.95,1],precision=50)
```

```
Out[195]: 0          (2.05, 82.74]
1          (2.05, 82.74]
2          (2.05, 82.74]
3          (2.05, 82.74]
4          (2.05, 82.74]
...
16286     (0.01, 0.17]
16287     (0.01, 0.17]
16288     (0.01, 0.17]
16289     (0.01, 0.17]
16290     (0.01, 0.17]
Name: Global Sales, Length: 16291, dtype: category
Categories (4, interval[float64, right]): [(0.01, 0.17] < (0.17, 0.48] <
(0.48, 2.05] < (2.05, 82.74]]
```

```
In [197... pd.qcut(x=data["Global Sales"], q=[0, 0.5, 0.75, 0.95, 1], labels=["Low tier", "Above Avg", "Popular Games", "Mega Hits"], precision=50).value_counts()
```

```
Out[197]: Global Sales
Low tier        8229
Above Avg       4039
Popular Games   3212
Mega Hits        811
Name: count, dtype: int64
```

```
In [199... data["Popularity"] = pd.qcut(x=data["Global Sales"], q=[0, 0.5, 0.75, 0.95, 1], precision=50)
```

```
In [200... data
```

Out[200]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 12 columns

In [201]:

apply

```
sony = ["PS", "PS2", "PS3", "PS4", "PSP", "PSV"]
nintendo = ["N64", "GB", "GBA", "GC", "Wii", "WiiU", "DS", "NES", "3DS", "2DS"]
microsoft = ["XB", "XB360", "XOne"]
pc = ["PC"]
atari = ["2600"]
panasonic = ["3DO"]
sega = ["DC", "GG", "SAT", "SCD"]
```

In [202]:

```
def categories(x):
    if x in sony:
        return "Sony"
    elif x in nintendo:
        return "Nintendo"
    elif x in microsoft:
        return "Microsoft"
    elif x in pc:
        return "Pc"
    elif x in sega:
        return "Sega"
    else:
        return "Other"
```

```
In [205...]: data["Platform"]
```

```
Out[205]: 0      Wii
           1      NES
           2      Wii
           3      Wii
           4      GB
           ...
          16286   GBA
          16287   GC
          16288   PS2
          16289   DS
          16290   GBA
Name: Platform, Length: 16291, dtype: object
```

```
In [206...]: data["Platform"].apply(categories)
```

```
Out[206]: 0      Nintendo
           1      Nintendo
           2      Nintendo
           3      Nintendo
           4      Nintendo
           ...
          16286   Nintendo
          16287   Nintendo
          16288   Sony
          16289   Nintendo
          16290   Nintendo
Name: Platform, Length: 16291, dtype: object
```

```
In [207...]: data["Platform"].apply(categories).value_counts()
```

```
Out[207]: Platform
          Sony      6563
          Nintendo  6141
          Other     1401
          Microsoft 1016
          PC        938
          Sega      232
Name: count, dtype: int64
```

```
In [208...]: data["Platform_Company"] = data["Platform"].apply(categories)
```

```
In [209...]: data
```

Out [209]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 13 columns

In [211]: `import scipy.stats as stats`In [212]: `z_score = data.select_dtypes("float").apply(lambda x: stats.zscore(x))`In [213]: `z_score`

Out [213]:

	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sales
0	50.126469	56.691515	11.835597	44.253501	52.446423
1	35.036615	6.739357	21.583251	3.796218	25.329663
2	18.949687	25.000169	11.899727	17.159222	22.509520
3	18.828093	21.328372	10.264430	15.317863	20.710243
4	13.380668	17.165692	32.517296	5.006254	19.670236
...
16286	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743
16287	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743
16288	-0.323011	-0.290075	-0.252776	-0.254771	-0.338743
16289	-0.323011	-0.270439	-0.252776	-0.254771	-0.338743
16290	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743

16291 rows × 5 columns

In [214...]

z_score.mean()

Out [214]:

NA_Sales	-2.791402e-17
EU_Sales	0.000000e+00
JP_Sales	-5.582805e-17
Other_Sales	-1.395701e-17
Global Sales	5.582805e-17
dtype:	float64

In [215...]

z_score.std()

Out [215]:

NA_Sales	1.000031
EU_Sales	1.000031
JP_Sales	1.000031
Other_Sales	1.000031
Global Sales	1.000031
dtype:	float64

In [257...]

z_score

Out [257]:

	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global Sales
0	50.126469	56.691515	11.835597	44.253501	52.446423
1	35.036615	6.739357	21.583251	3.796218	25.329663
2	18.949687	25.000169	11.899727	17.159222	22.509520
3	18.828093	21.328372	10.264430	15.317863	20.710243
4	13.380668	17.165692	32.517296	5.006254	19.670236
...
16286	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743
16287	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743
16288	-0.323011	-0.290075	-0.252776	-0.254771	-0.338743
16289	-0.323011	-0.270439	-0.252776	-0.254771	-0.338743
16290	-0.310852	-0.290075	-0.252776	-0.254771	-0.338743

16291 rows × 5 columns

In [345...]

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [346...]

```
data = pd.read_csv("https://raw.githubusercontent.com/cajjster/data_files/mo
```

In [347...]

```
data
```

Out [347]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 10 columns

In [348...]

```
# corr()

corr_matrix = data.drop("Year", axis=1)
```

In [349...]

corr_matrix

Out [349]:

	Name	Platform	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales
0	Wii Sports	Wii	Sports	Nintendo	41.49	29.02	3.77	
1	Super Mario Bros.	NES	Platform	Nintendo	29.08	3.58	6.81	
2	Mario Kart Wii	Wii	Racing	Nintendo	15.85	12.88	3.79	
3	Wii Sports Resort	Wii	Sports	Nintendo	15.75	11.01	3.28	
4	Pokemon Red/Pokemon Blue	GB	Role-Playing	Nintendo	11.27	8.89	10.22	
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	Platform	Kemco	0.01	0.00	0.00	
16287	Men in Black II: Alien Escape	GC	Shooter	Infogrames	0.01	0.00	0.00	
16288	SCORE International Baja 1000: The Official Game	PS2	Racing	Activision	0.00	0.00	0.00	
16289	Know How 2	DS	Puzzle	7G//AMES	0.00	0.01	0.00	
16290	Spirits & Spells	GBA	Platform	Wanadoo	0.01	0.00	0.00	

16291 rows × 9 columns

In [350]: non_numeric_columns = data.select_dtypes(exclude='number').columns

In [351]: data[non_numeric_columns] = data[non_numeric_columns].apply(pd.to_numeric, errors='coerce')

In [241]: data_without_year = data.drop("Year", axis=1)

In [352]: numeric_data = data_without_year.select_dtypes(include='number')

In [353]: corr_matrix = numeric_data.corr()

In [244]: print(corr_matrix)

	Name	Platform	Genre	Publisher	NA_Sales	EU_Sales	\
Name	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Genre	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Publisher	NaN	NaN	NaN	NaN	NaN	NaN	NaN
NA_Sales	NaN	NaN	NaN	NaN	1.000000	0.768923	
EU_Sales	NaN	NaN	NaN	NaN	0.768923	1.000000	
JP_Sales	NaN	NaN	NaN	NaN	0.451283	0.436379	
Other_Sales	NaN	NaN	NaN	NaN	0.634518	0.726256	
Global Sales	NaN	NaN	NaN	NaN	0.941269	0.903264	
Decade	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Popularity	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform_Company	NaN	NaN	NaN	NaN	NaN	NaN	NaN
\							
Name	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Genre	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Publisher	NaN	NaN	NaN	NaN	NaN	NaN	NaN
NA_Sales	0.451283	0.634518	0.941269	NaN	NaN	NaN	NaN
EU_Sales	0.436379	0.726256	0.903264	NaN	NaN	NaN	NaN
JP_Sales	1.000000	0.290559	0.612774	NaN	NaN	NaN	NaN
Other_Sales	0.290559	1.000000	0.747964	NaN	NaN	NaN	NaN
Global Sales	0.612774	0.747964	1.000000	NaN	NaN	NaN	NaN
Decade	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Popularity	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform_Company	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform_Company							
Name	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Genre	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Publisher	NaN	NaN	NaN	NaN	NaN	NaN	NaN
NA_Sales	NaN	NaN	NaN	NaN	NaN	NaN	NaN
EU_Sales	NaN	NaN	NaN	NaN	NaN	NaN	NaN
JP_Sales	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Other_Sales	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Global Sales	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Decade	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Popularity	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform_Company	NaN	NaN	NaN	NaN	NaN	NaN	NaN

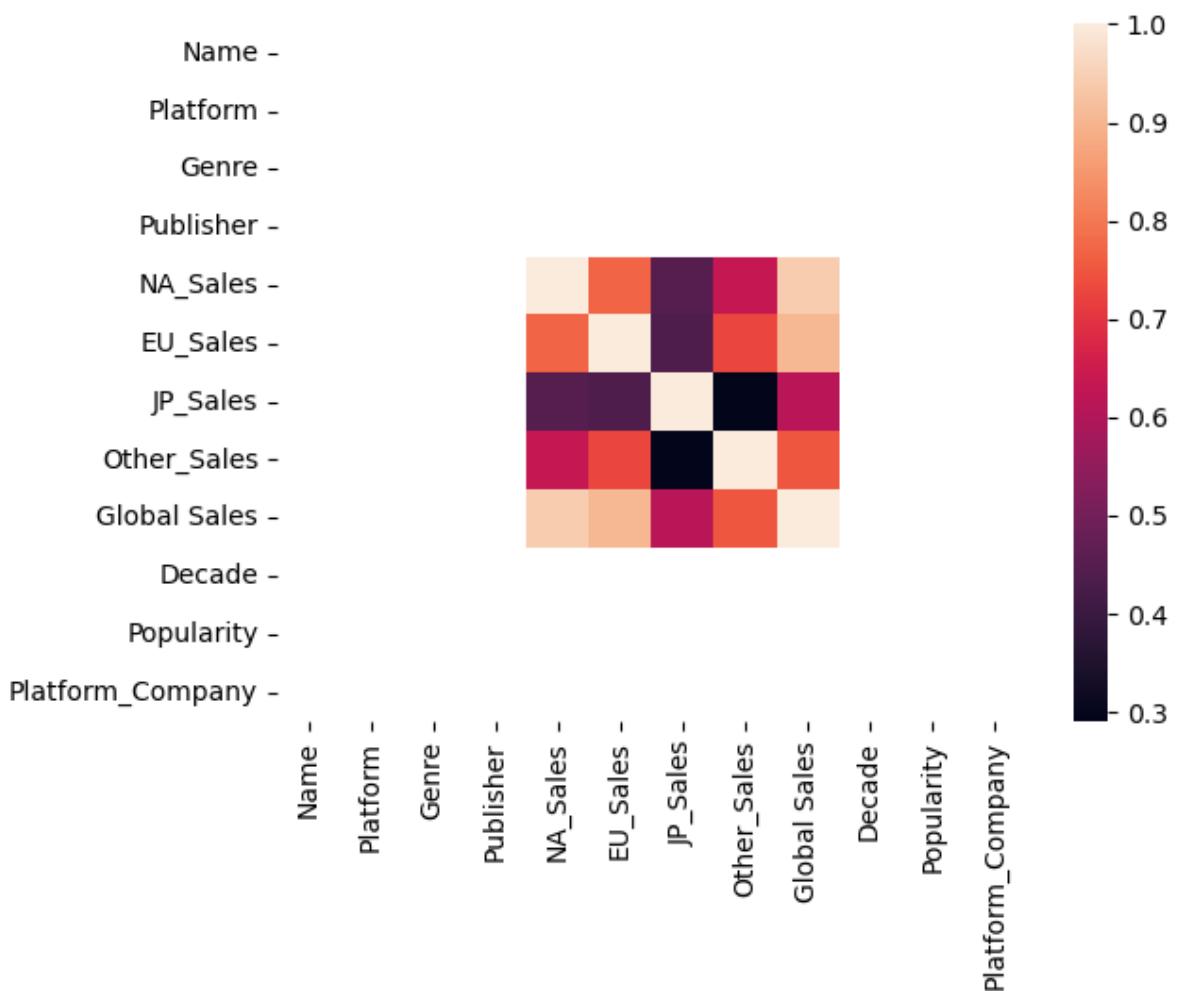
In [354]: corr_matrix

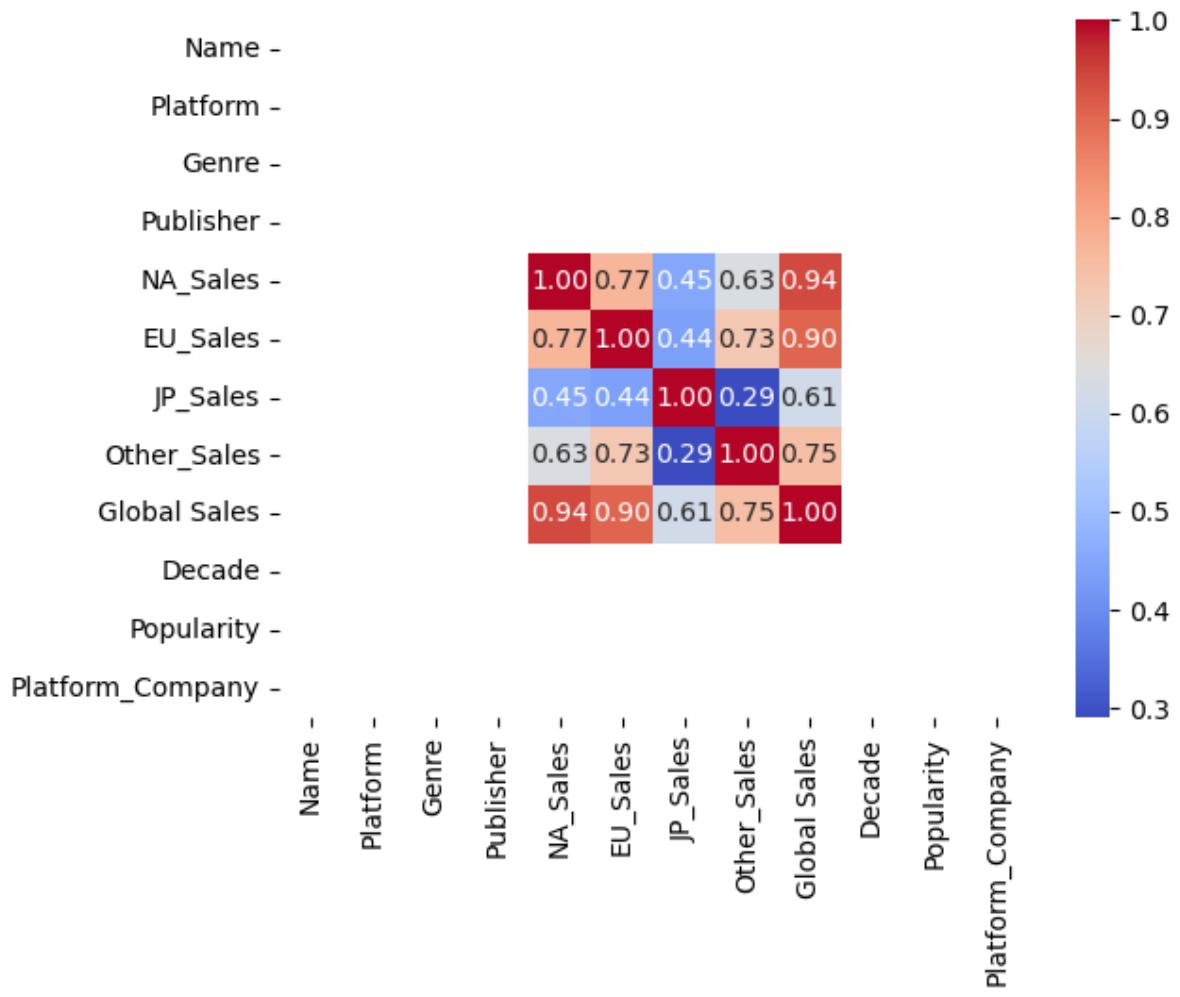
Out [354]:

	Name	Platform	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Oth
Name	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Genre	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Publisher	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
NA_Sales	NaN	NaN	NaN	NaN	1.000000	0.768923	0.451283	0.000000
EU_Sales	NaN	NaN	NaN	NaN	0.768923	1.000000	0.436379	0.000000
JP_Sales	NaN	NaN	NaN	NaN	0.451283	0.436379	1.000000	0.000000
Other_Sales	NaN	NaN	NaN	NaN	0.634518	0.726256	0.290559	0.000000
Global Sales	NaN	NaN	NaN	NaN	0.941269	0.903264	0.612774	0.000000
Decade	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Popularity	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Platform_Company	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

In [250]: `sns.heatmap(corr_matrix)`

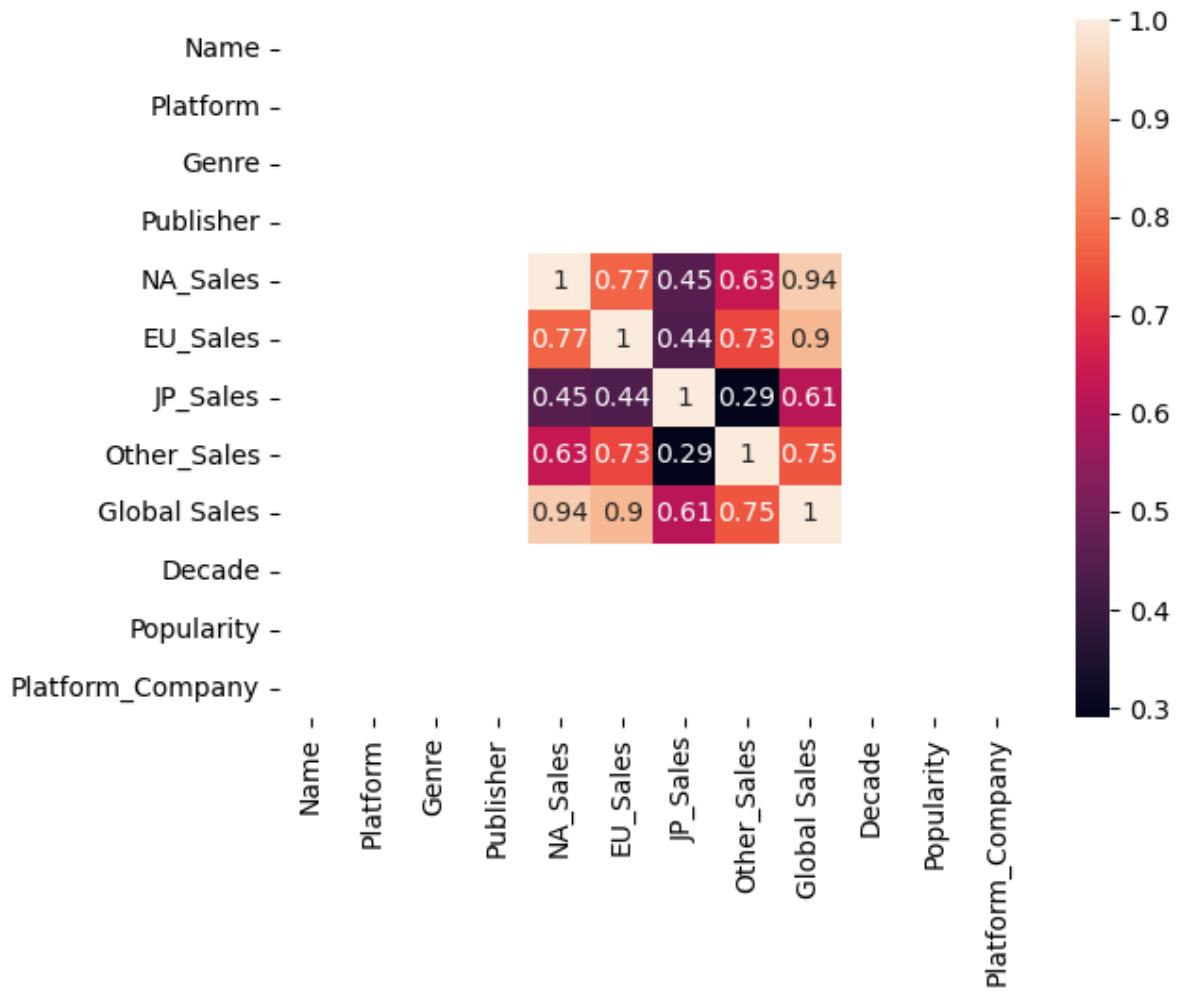
Out [250]: <Axes: >

In [247]: `sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt='.2f')`
`plt.show()`



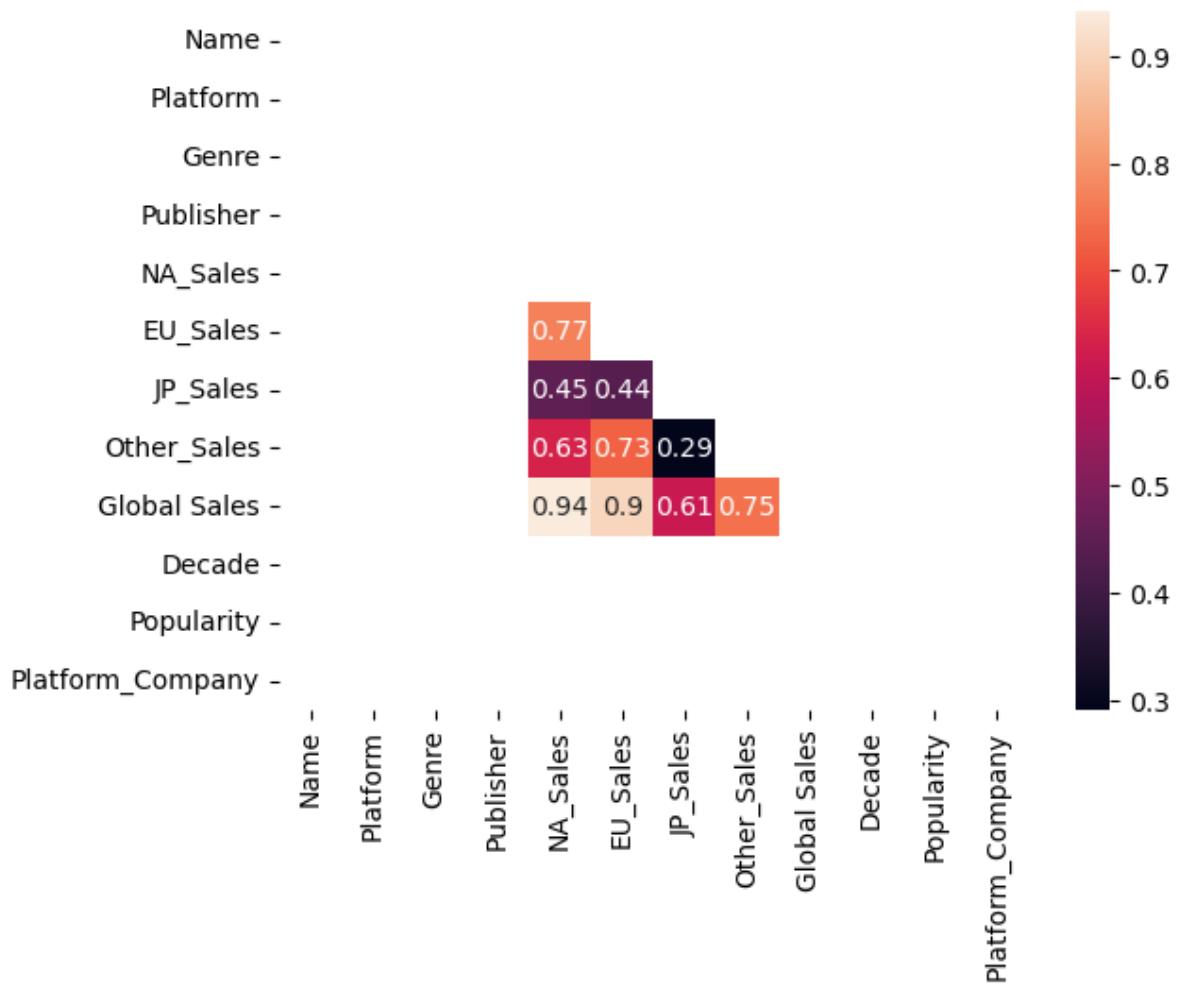
In [248]: `sns.heatmap(corr_matrix, annot=True)`

Out[248]: <Axes: >



```
In [261]: matrix = np.triu(corr_matrix)
sns.heatmap(corr_matrix, annot=True, mask=matrix)
```

```
Out[261]: <Axes: >
```



GroupBy , most important thing

```
In [310...]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [311...]: data = pd.read_csv("https://raw.githubusercontent.com/cajjster/data_files/master/games.csv")
```

```
In [312...]: data
```

Out[312]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 10 columns

In [313...]

data.groupby("Genre")["NA_Sales"].mean()

Out[313]:

```
Genre
Action      0.265078
Adventure   0.080008
Fighting    0.264043
Misc        0.235421
Platform    0.509703
Puzzle      0.214053
Racing      0.291371
Role-Playing 0.222109
Shooter     0.448643
Simulation  0.214363
Sports       0.290838
Strategy    0.101239
Name: NA_Sales, dtype: float64
```

In [314...]

data.Genre.unique()

Out[314]:

```
array(['Sports', 'Platform', 'Racing', 'Role-Playing', 'Puzzle', 'Misc',
       'Shooter', 'Simulation', 'Action', 'Fighting', 'Adventure',
       'Strategy'], dtype=object)
```

In [315...]

print(data["NA_Sales"].mean())

```
data.loc[data["Genre"] == "Shooter", "NA_Sales"]
```

0.26564667607881653

Out[315]:

9	26.93
29	9.03
31	9.67
33	5.77
34	4.99

..	
16196	0.01
16262	0.01
16270	0.00
16278	0.01
16287	0.01

Name: NA_Sales, Length: 1282, dtype: float64

In [316]:

```
print(data["NA_Sales"].mean())
```

```
data.loc[data["Genre"] == "Shooter", "NA_Sales"].mean()
```

0.26564667607881653

Out[316]:

0.44864274570982837

In [317]:

```
sales_by_genre = data.groupby("Genre") [["NA_Sales", "EU_Sales", "JP_Sales", "Other_Sales"]]
sales_by_genre
```

Out[317]:

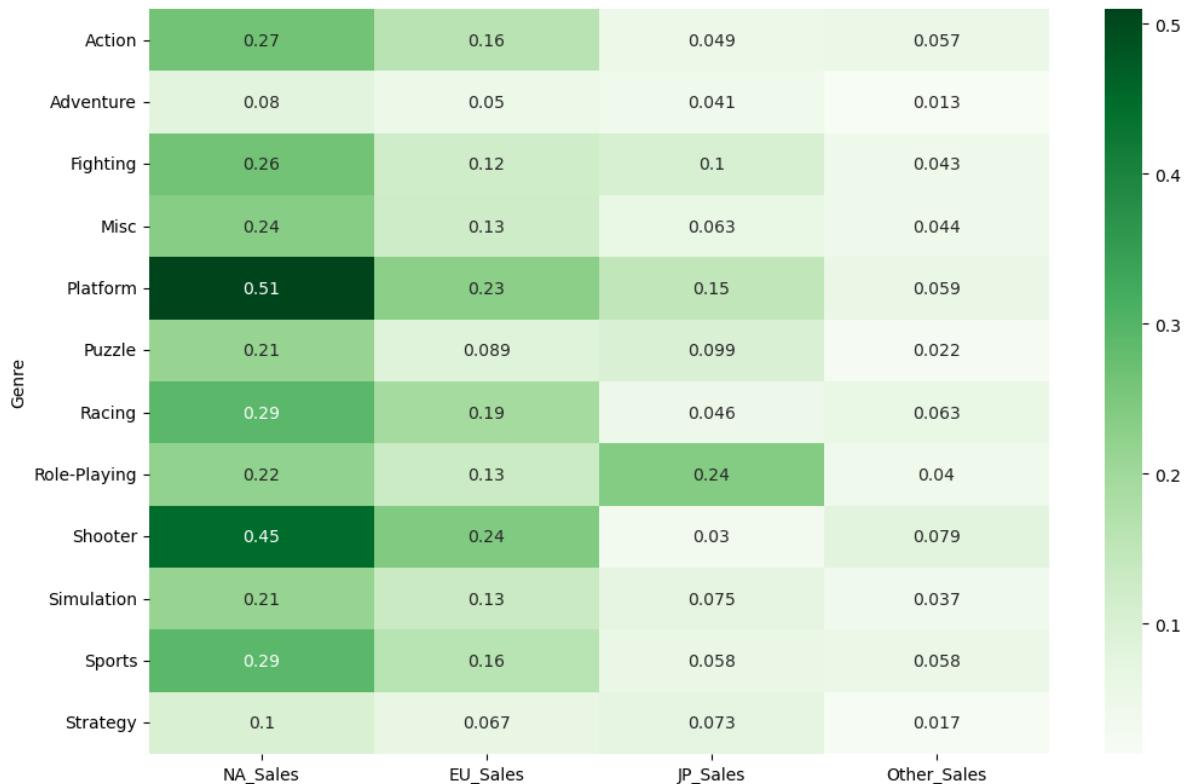
Genre	NA_Sales	EU_Sales	JP_Sales	Other_Sales
Action	0.265078	0.158868	0.048800	0.056881
Adventure	0.080008	0.050031	0.040808	0.013108
Fighting	0.264043	0.119617	0.104246	0.043289
Misc	0.235421	0.125605	0.063268	0.043843
Platform	0.509703	0.229314	0.149314	0.058869
Puzzle	0.214053	0.088632	0.099439	0.021877
Racing	0.291371	0.192906	0.046212	0.062596
Role-Playing	0.222109	0.127599	0.238293	0.040395
Shooter	0.448643	0.242161	0.029782	0.079485
Simulation	0.214363	0.133278	0.074929	0.036981
Sports	0.290838	0.161172	0.058490	0.057574
Strategy	0.101239	0.066925	0.073284	0.016761

In [327]:

```
plt.figure(figsize=(12,8))
sns.heatmap(sales_by_genre, annot=True, cmap="Greens")
```

Out[327]:

<Axes: ylabel='Genre'>



```
In [379]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [380]: data = pd.read_csv("https://raw.githubusercontent.com/cajjster/data_files/master/gamesales.csv")
```

```
In [381]: data
```

Out [381]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 10 columns

In [382...]

```
sony = ["PS", "PS2", "PS3", "PS4", "PSP", "PSV"]
nintendo = ["N64", "GB", "GBA", "GC", "Wii", "WiiU", "DS", "NES", "3DS", "WiiM", "WiiUPro", "WiiUHD", "Switch", "SwitchLite"]
microsoft = ["XB", "XB360", "XOne"]
pc = ["PC"]
atari = ["2600"]
panasonic = ["3DO"]
sega = ["DC", "GG", "SAT", "SCD"]
```

In [383...]

```
def categories(x):
    if x in sony:
        return "Sony"
    elif x in nintendo:
        return "Nintendo"
    elif x in microsoft:
        return "Microsoft"
    elif x in pc:
        return "Pc"
    elif x in sega:
        return "Sega"
    else:
        return "Other"
```

In [384...]

```
data["Platform"]
```

```
Out[384]: 0      Wii
           1      NES
           2      Wii
           3      Wii
           4      GB
           ...
          16286    GBA
          16287    GC
          16288    PS2
          16289    DS
          16290    GBA
Name: Platform, Length: 16291, dtype: object
```

```
In [385... data["Platform"].apply(categories)
```

```
Out[385]: 0      Nintendo
           1      Nintendo
           2      Nintendo
           3      Nintendo
           4      Nintendo
           ...
          16286    Nintendo
          16287    Nintendo
          16288    Sony
          16289    Nintendo
          16290    Nintendo
Name: Platform, Length: 16291, dtype: object
```

```
In [386... data["Platform"].apply(categories).value_counts()
```

```
Out[386]: Platform
          Sony        6563
          Nintendo   6141
          Other       1401
          Microsoft   1016
          PC          938
          Sega        232
Name: count, dtype: int64
```

```
In [387... data["Platform_Company"] = data["Platform"].apply(categories)
```

```
In [388... data
```

Out [388]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 11 columns

In [389]:

`data.groupby("Platform_Company")["JP_Sales"].agg("mean")`

Out [389]:

Platform_Company	JP_Sales
Microsoft	0.001693
Nintendo	0.123004
Other	0.012934
Pc	0.000181
Sega	0.178060
Sony	0.071245

Name: JP_Sales, dtype: float64

In [390]:

`data.groupby("Platform_Company")["JP_Sales"].agg("count")`

Out [390]:

Platform_Company	JP_Sales
Microsoft	1016
Nintendo	6141
Other	1401
Pc	938
Sega	232
Sony	6563

Name: JP_Sales, dtype: int64

In [392]:

`data.groupby("Platform_Company")["JP_Sales"].agg(["mean","median","count"])`

Out [392]:

Platform_Company		mean	median	count
Microsoft	0.001693	0.00	1016	
Nintendo	0.123004	0.00	6141	
Other	0.012934	0.00	1401	
Pc	0.000181	0.00	938	
Sega	0.178060	0.12	232	
Sony	0.071245	0.00	6563	

In [393...]: `data.groupby("Platform_Company")[["JP_Sales", "Global Sales"]].agg({"JP_Sales": "mean", "Global Sales": "mean"})`

Out [393]:

Platform_Company		JP_Sales			Global Sales
		min	max	mean	mean
Microsoft	0.0	0.24	0.001693	0.386959	
Nintendo	0.0	10.22	0.123004	0.567230	
Other	0.0	0.51	0.012934	0.776360	
Pc	0.0	0.09	0.000181	0.271535	
Sega	0.0	1.30	0.178060	0.221853	
Sony	0.0	4.87	0.071245	0.539633	

In [394...]: `data.groupby(['Platform_Company'])["Global Sales"].sum()`

Out [394]:

In [399...]: `data["Decade"] = pd.cut(x=data["Year"], bins=[1980, 1989, 1999, 2009, 2019], labels=["1980s", "1990s", "2000s", "2010s", "2020s"])`In [400...]: `data.groupby(['Platform_Company', 'Decade'])["Global Sales"].sum()`

```
Out[400]: Platform_Company    Decade      Global_Sales
          Microsoft        80s         0.00
                           90s         0.00
                           00s       252.09
                           10s      141.06
          Nintendo        80s       289.95
                           90s      567.47
                           00s     1935.84
                           10s      689.81
          Other           80s       86.57
                           90s      30.55
                           00s      413.61
                           10s      556.95
          Pc              80s       0.06
                           90s      49.98
                           00s      84.88
                           10s     119.78
          Sega            80s       0.00
                           90s      44.06
                           00s      7.41
                           10s       0.00
          Sony            80s       0.00
                           90s     586.85
                           00s    1942.25
                           10s    1012.51
Name: Global Sales, dtype: float64
```

```
In [401...]: data.groupby(['Decade', 'Platform_Company'])["Global Sales"].sum()
```

```
Out[401]: Decade  Platform_Company      Global_Sales
          80s     Microsoft           0.00
                           Nintendo       289.95
                           Other          86.57
                           Pc             0.06
                           Sega            0.00
                           Sony            0.00
          90s     Microsoft           0.00
                           Nintendo       567.47
                           Other          30.55
                           Pc             49.98
                           Sega          44.06
                           Sony          586.85
          00s     Microsoft       252.09
                           Nintendo     1935.84
                           Other          413.61
                           Pc             84.88
                           Sega          7.41
                           Sony          1942.25
          10s     Microsoft      141.06
                           Nintendo       689.81
                           Other          556.95
                           Pc             119.78
                           Sega            0.00
                           Sony          1012.51
Name: Global Sales, dtype: float64
```

```
In [402...]: data.groupby(['Decade', 'Platform_Company'])["Global Sales"].sum().unstack()
```

Out[402]: Platform_Company Microsoft Nintendo Other Pc Sega Sony

Decade		80s	0.00	289.95	86.57	0.06	0.00	0.00
	90s	0.00	567.47	30.55	49.98	44.06	586.85	
	00s	252.09	1935.84	413.61	84.88	7.41	1942.25	
	10s	141.06	689.81	556.95	119.78	0.00	1012.51	

In [403...]: data.groupby(['Decade', 'Platform_Company'])["Global Sales"].sum().unstack(-1)

Out[403]: Platform_Company Microsoft Nintendo Other Pc Sega Sony

Decade		80s	0.00	289.95	86.57	0.06	0.00	0.00
	90s	0.00	567.47	30.55	49.98	44.06	586.85	
	00s	252.09	1935.84	413.61	84.88	7.41	1942.25	
	10s	141.06	689.81	556.95	119.78	0.00	1012.51	

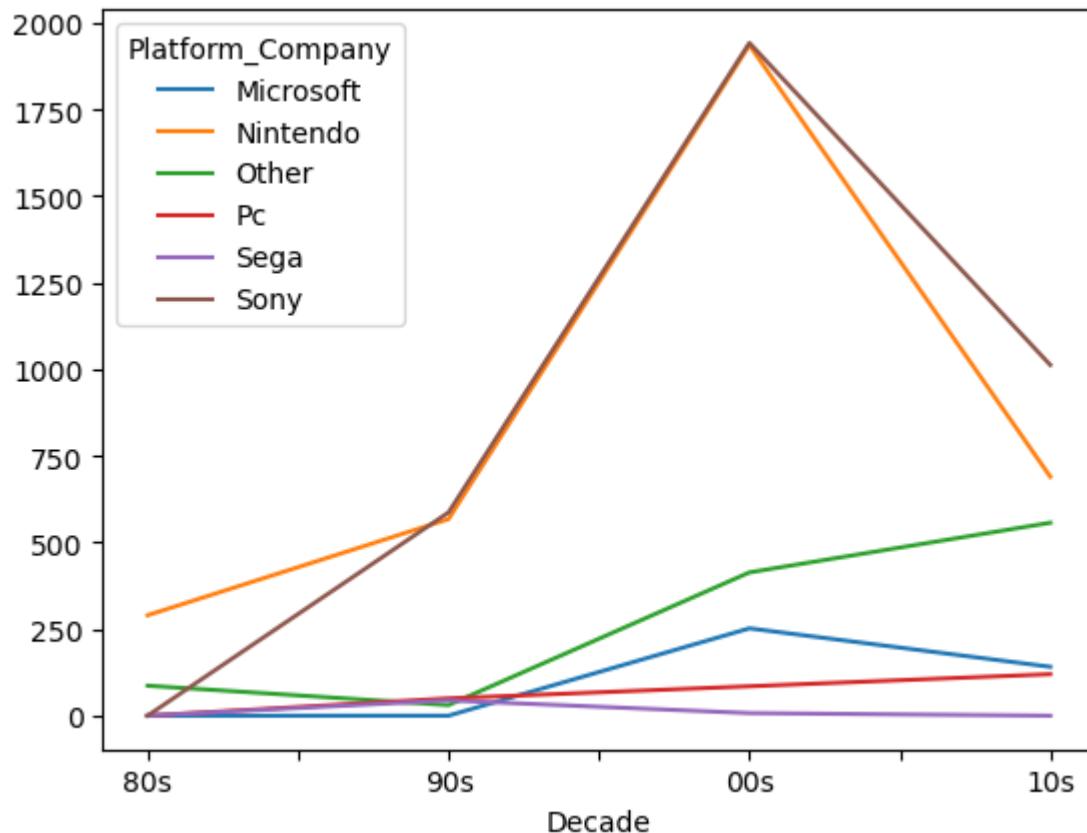
In [404...]: data.groupby(['Decade', 'Platform_Company'])["Global Sales"].sum().unstack(-2)

Out[404]: Decade 80s 90s 00s 10s

Platform_Company		Microsoft	0.00	0.00	252.09	141.06
	Nintendo	289.95	567.47	1935.84	689.81	
	Other	86.57	30.55	413.61	556.95	
	Pc	0.06	49.98	84.88	119.78	
	Sega	0.00	44.06	7.41	0.00	
	Sony	0.00	586.85	1942.25	1012.51	

In [405...]: data.groupby(['Decade', 'Platform_Company'])["Global Sales"].sum().unstack(-2)

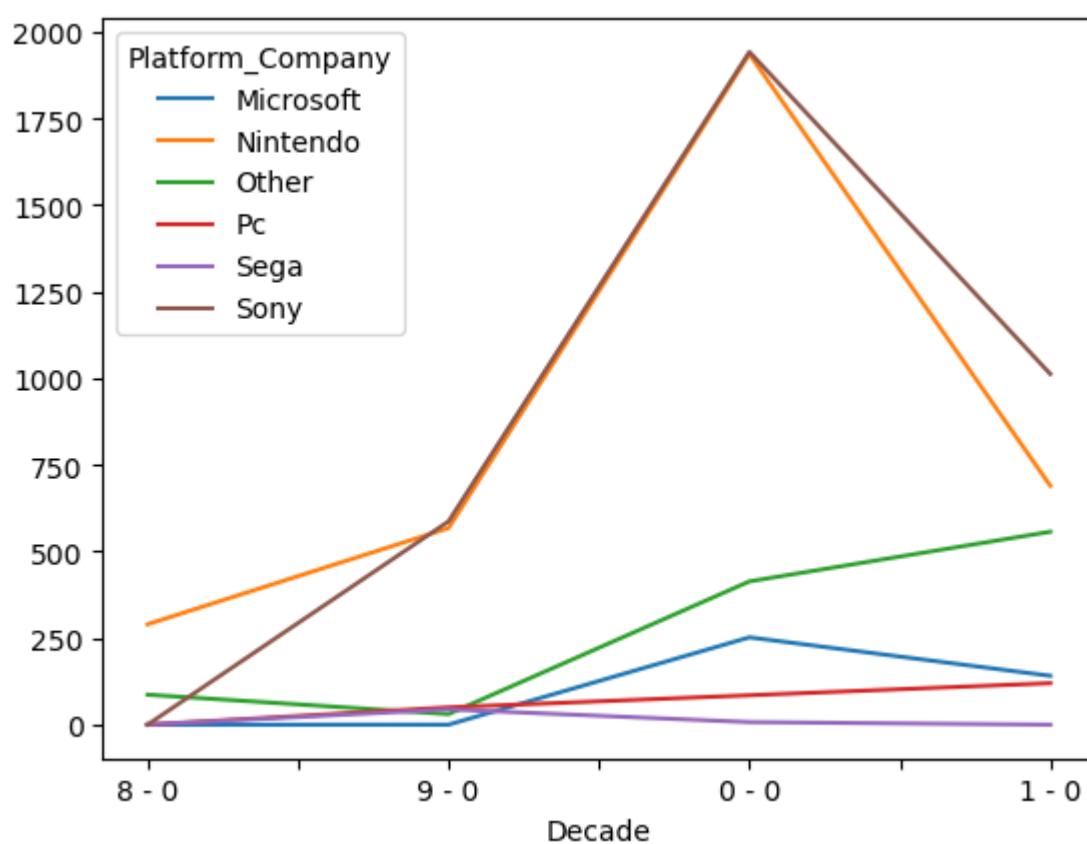
Out[405]: <Axes: xlabel='Decade'>



```
In [435]: platform_sales_per_decade.index = platform_sales_per_decade.index.map(lambda
```

```
In [436]: platform_sales_per_decade.plot.line()
```

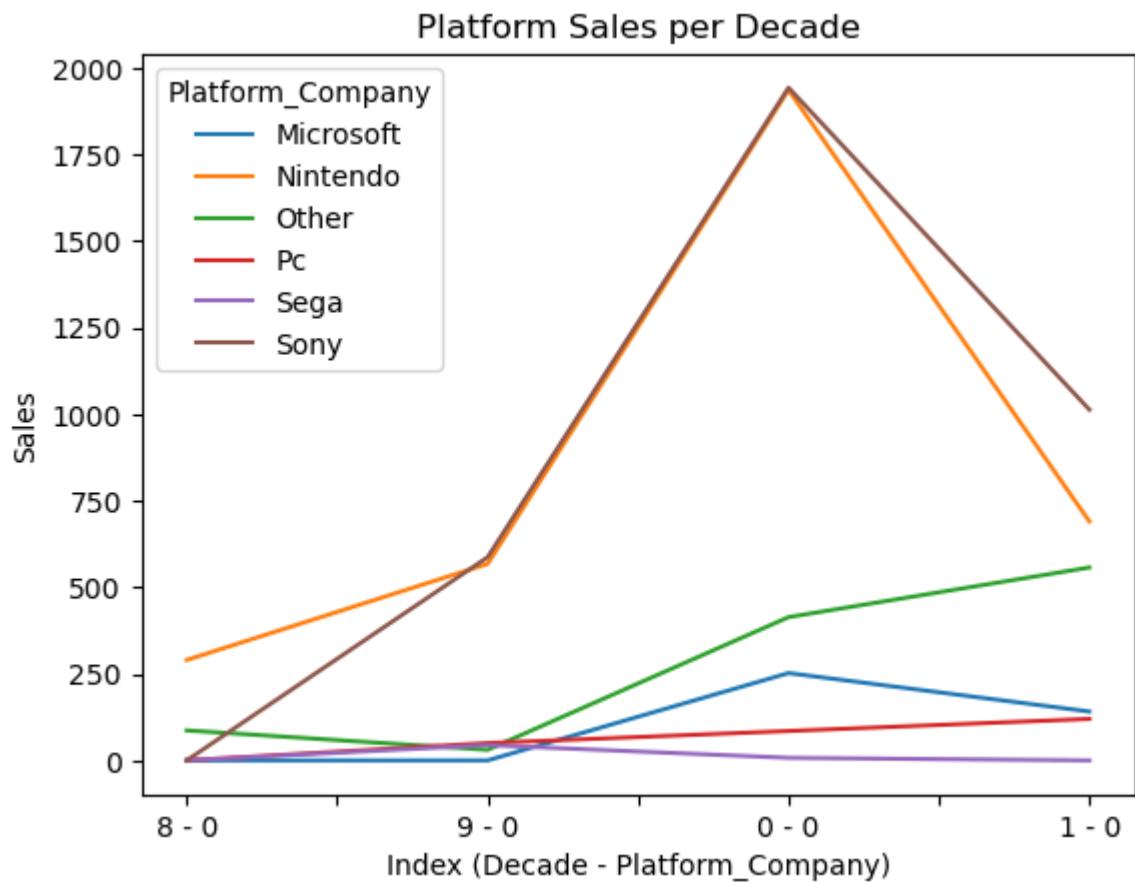
```
Out[436]: <Axes: xlabel='Decade'>
```



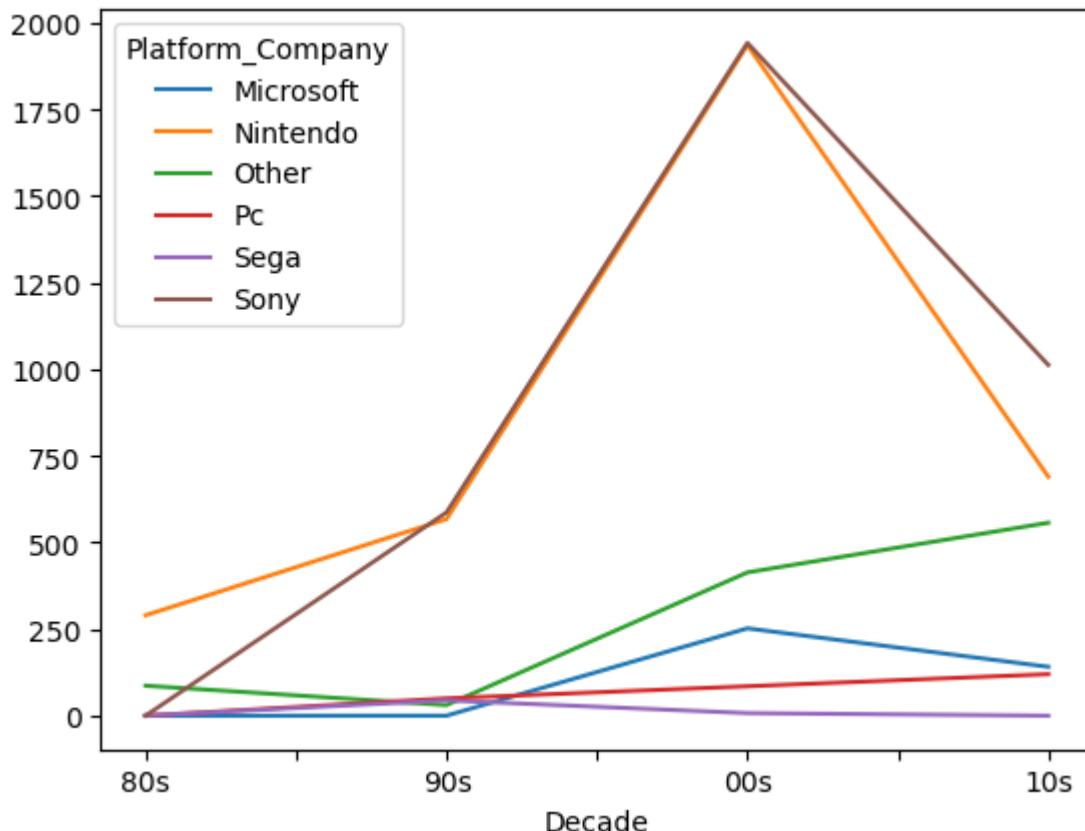
```
In [438]: platform_sales_per_decade.plot.line()
```

```
# Add labels and title
plt.xlabel('Index (Decade - Platform_Company)')
plt.ylabel('Sales')
plt.title('Platform Sales per Decade')

# Show the plot
plt.show()
```



```
In [407...]: platform_sales_per_decade = data.groupby(['Decade', 'Platform_Company'])["Glo
```



```
In [410]: import pandas as pd
```

```
In [413]: import matplotlib.pyplot as plt
```

```
In [444]: platform_sales_per_decade
```

```
Out[444]: Platform_Company    Microsoft    Nintendo    Other     PC     Sega     Sony
```

	Decade					
	8 - 0	0.00	289.95	86.57	0.06	0.00
	9 - 0	0.00	567.47	30.55	49.98	44.06
	0 - 0	252.09	1935.84	413.61	84.88	7.41
	1 - 0	141.06	689.81	556.95	119.78	0.00

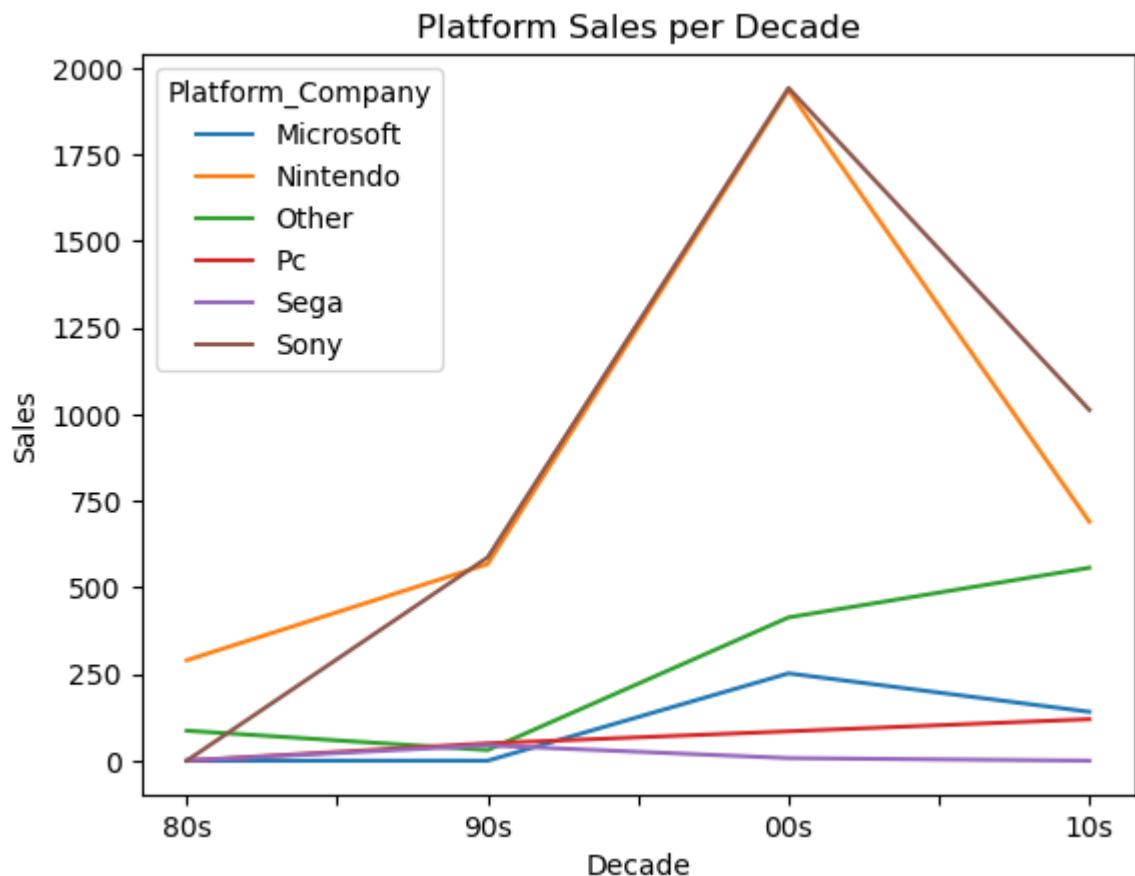
```
In [446]: import matplotlib.pyplot as plt
```

```
# Assuming platform_sales_per_decade is a Pandas DataFrame
platform_sales_per_decade = data.groupby(['Decade', 'Platform_Company'])['Global_Sales'].sum().reset_index()

# Plot the data
platform_sales_per_decade.plot.line()

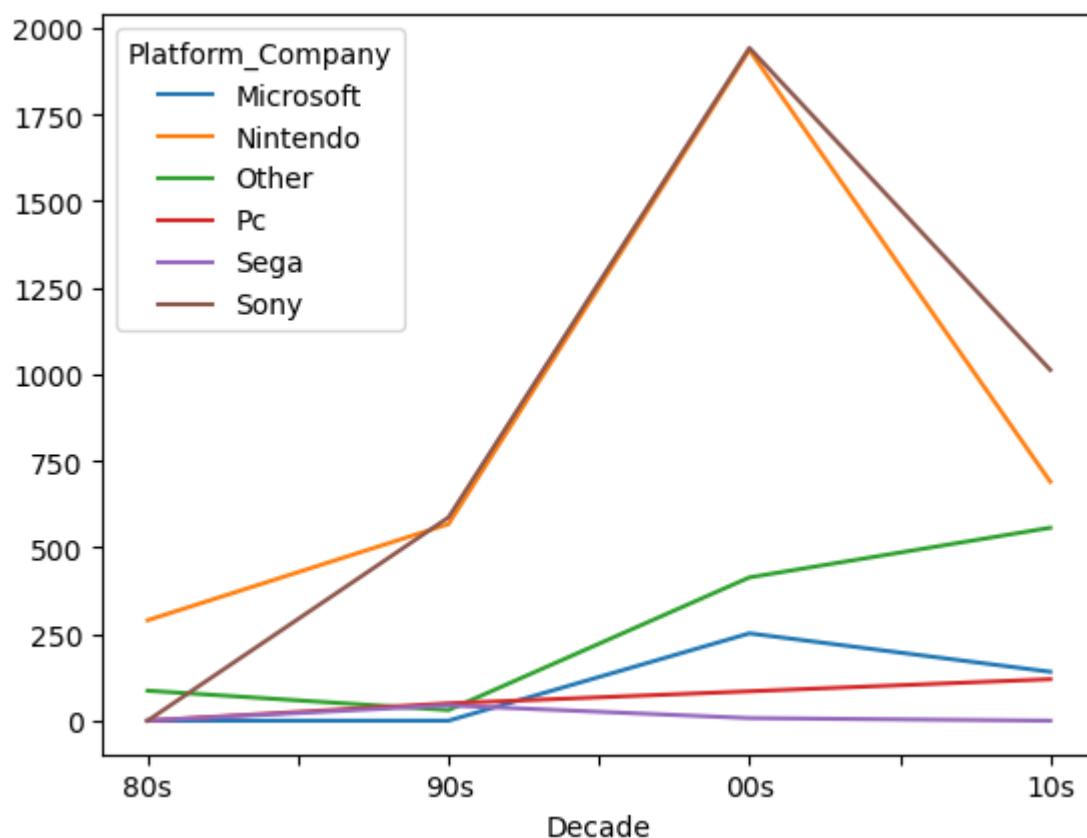
# Add labels and title
plt.xlabel('Decade')
plt.ylabel('Sales')
plt.title('Platform Sales per Decade')

# Show the plot
plt.show()
```



```
In [447]: platform_sales_per_decade.plot.line()
```

```
Out[447]: <Axes: xlabel='Decade'>
```



```
In [448]: platform_sales_per_decade.columns
```

```
Out[448]: Index(['Microsoft', 'Nintendo', 'Other', 'PC', 'Sega', 'Sony'], dtype='object', name='Platform_Company')
```

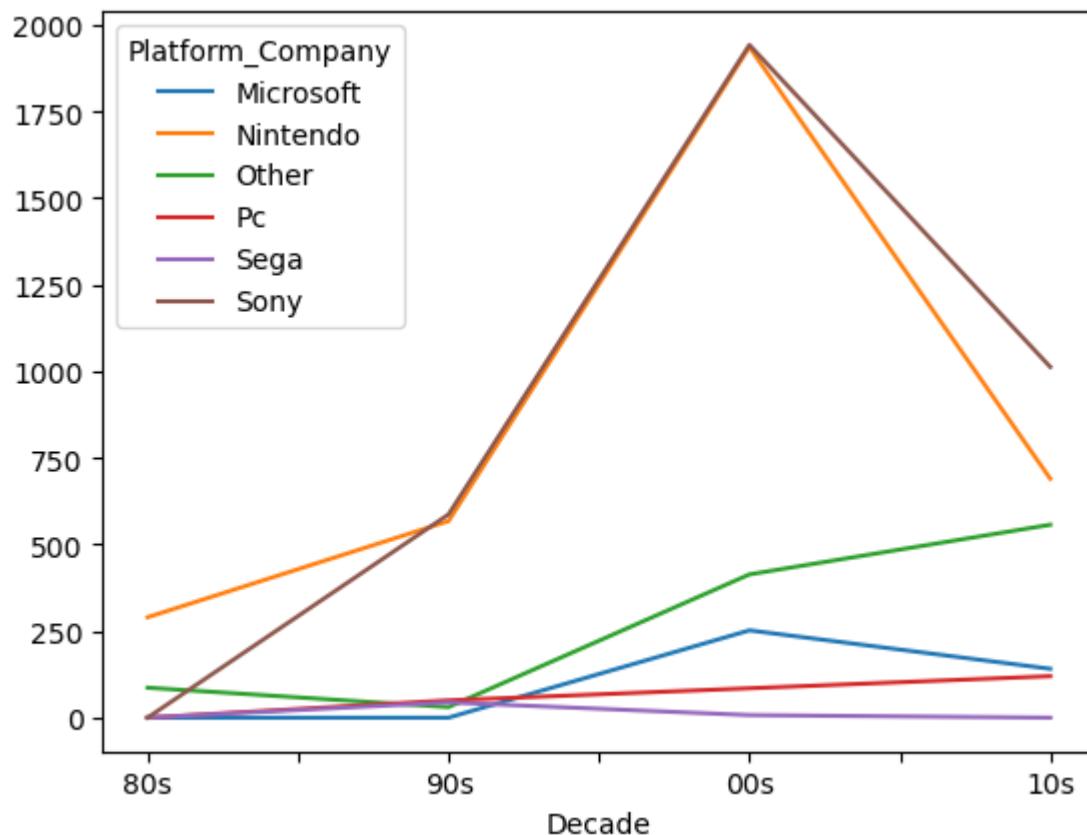
```
In [449]: platform_sales_per_decade.columns.get_level_values(0)
```

```
Out[449]: Index(['Microsoft', 'Nintendo', 'Other', 'Pc', 'Sega', 'Sony'], dtype='object', name='Platform_Company')
```

```
In [450]: platform_sales_per_decade.columns = platform_sales_per_decade.columns.get_level_values(0)
```

```
In [451]: platform_sales_per_decade.plot.line()
```

```
Out[451]: <Axes: xlabel='Decade'>
```



How to pivot our data

```
In [ ]: # pivot table , crosstab, transpose
```

```
In [452]: platform_sales_per_decade
```

```
Out[452]: Platform_Company  Microsoft  Nintendo  Other  Pc  Sega  Sony
```

	Decade	80s	90s	00s	10s
Platform_Company	Microsoft	0.00	289.95	86.57	0.06
	Nintendo	0.00	567.47	30.55	49.98
	Other	0.00	44.06	84.88	7.41
	Pc	0.00	586.85	1942.25	119.78
	Sega	0.00	0.00	0.00	0.00
	Sony	0.00	1012.51	0.00	0.00

```
In [453]: platform_sales_per_decade.T
```

Out [453]:

	Decade	80s	90s	00s	10s
Platform_Company					
	Microsoft	0.00	0.00	252.09	141.06
	Nintendo	289.95	567.47	1935.84	689.81
	Other	86.57	30.55	413.61	556.95
	Pc	0.06	49.98	84.88	119.78
	Sega	0.00	44.06	7.41	0.00
	Sony	0.00	586.85	1942.25	1012.51

In [459...:

print(data.columns)

```
Index(['Name', 'Platform', 'Year', 'Genre', 'Publisher', 'NA_Sales',
       'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global Sales',
       'Platform_Company', 'Decade'],
      dtype='object')
```

In [463...:

data

Out[463]:

	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22
...
16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 12 columns

In [471...:

data.pivot_table(values="JP_Sales", index="Decade", columns="Genre", aggfunc=

Out [471]:	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role Playing
Decade									
	80s	0.125909	0.805000	0.730000	0.607500	0.983333	0.656316	0.461250	1.408889
	90s	0.120988	0.137010	0.204508	0.144224	0.343920	0.282113	0.137705	0.57558
	00s	0.037868	0.034234	0.070136	0.061201	0.069594	0.056932	0.026305	0.188751
	10s	0.049179	0.028450	0.069848	0.042522	0.105000	0.029565	0.028541	0.180321

In [472]: `data['Popularity'] = data['Global Sales'] / data['Global Sales'].max()`

In [473]: `data`

Out [473]:		Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales
	0	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77
	1	Super Mario Bros.	NES	1985	Platform	Nintendo	29.08	3.58	6.81
	2	Mario Kart Wii	Wii	2008	Racing	Nintendo	15.85	12.88	3.79
	3	Wii Sports Resort	Wii	2009	Sports	Nintendo	15.75	11.01	3.28
	4	Pokemon Red/Pokemon Blue	GB	1996	Role-Playing	Nintendo	11.27	8.89	10.22

	16286	Woody Woodpecker in Crazy Castle 5	GBA	2002	Platform	Kemco	0.01	0.00	0.00
	16287	Men in Black II: Alien Escape	GC	2003	Shooter	Infogrames	0.01	0.00	0.00
	16288	SCORE International Baja 1000: The Official Game	PS2	2008	Racing	Activision	0.00	0.00	0.00
	16289	Know How 2	DS	2010	Puzzle	7G//AMES	0.00	0.01	0.00
	16290	Spirits & Spells	GBA	2003	Platform	Wanadoo	0.01	0.00	0.00

16291 rows × 13 columns

In [474]: `data.pivot_table(values="JP_Sales", index="Popularity", columns="Genre", aggfunc="sum")`

Out[474]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Pla
Popularity								
0.000121	0.005288	0.008435	0.006800	0.005932	0.002857	0.001471	0.001026	0.00
0.000242	0.010269	0.016010	0.011538	0.012473	0.000000	0.001923	0.000882	0.01
0.000363	0.011457	0.021163	0.023077	0.016071	0.004000	0.001034	0.001667	0.01
0.000483	0.013419	0.029610	0.020645	0.017534	0.007619	0.007059	0.003158	0.02
0.000604	0.018144	0.029315	0.023846	0.020441	0.004839	0.009459	0.004667	0.02
...
0.379139	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0.398840	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0.432922	NaN	NaN	NaN	NaN	NaN	NaN	NaN	3.790000
0.486343	NaN	NaN	NaN	NaN	NaN	6.810000	NaN	NaN
1.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

621 rows × 12 columns

In [475...]

`data.pivot_table(values="EU_Sales", index="Popularity", columns="Genre", aggfunc="sum")`

Out[475]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Pla
Popularity								
0.000121	0.002885	0.000816	0.000800	0.001695	0.002857	0.002353	0.003846	0.00
0.000242	0.004409	0.002260	0.002692	0.002796	0.003571	0.005577	0.006618	0.00
0.000363	0.007947	0.003876	0.002308	0.006310	0.008000	0.008621	0.009630	0.00
0.000483	0.010940	0.004545	0.003548	0.005342	0.008571	0.009412	0.012105	0.00
0.000604	0.009485	0.005479	0.007308	0.005882	0.010968	0.009189	0.014667	0.00
...
0.379139	NaN	NaN	NaN	NaN	NaN	NaN	NaN	8.89
0.398840	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0.432922	NaN	NaN	NaN	NaN	NaN	NaN	NaN	12.880000
0.486343	NaN	NaN	NaN	NaN	NaN	3.580000	NaN	NaN
1.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

621 rows × 12 columns

In [476...]

`data.pivot_table(values="EU_Sales", index="Popularity", columns="Genre", aggfunc="sum")`

Out[476]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter
Popularity										
0.000121	0.30	0.12	0.02	0.10	0.04	0.08	0.15	0.08	0.08	0.11
0.000242	0.82	0.47	0.07	0.26	0.10	0.29	0.45	0.37	0.37	0.52
0.000363	1.20	0.50	0.06	0.53	0.28	0.25	0.52	0.30	0.30	0.42
0.000483	1.28	0.35	0.11	0.39	0.18	0.32	0.46	0.28	0.28	0.41
0.000604	0.92	0.40	0.19	0.40	0.34	0.34	0.66	0.34	0.34	0.65
...
0.379139	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	8.89	NaN
0.398840	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0.432922	NaN	NaN	NaN	NaN	NaN	NaN	12.88	NaN	NaN	NaN
0.486343	NaN	NaN	NaN	NaN	3.58	NaN	NaN	NaN	NaN	NaN
1.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

621 rows × 12 columns

In [477]: `data.pivot_table(values="EU_Sales", index="Platform", columns="Genre", aggfunc=`

Out[477]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Strategy
Platform											
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	NaN	1.31		
3DO	NaN	0.00	NaN	NaN	NaN	0.00	NaN	NaN	NaN	NaN	NaN
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33		
DC	0.23	0.24	0.00	NaN	0.61	NaN	0.51	0.00	0.00		
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59		
GB	2.11	3.50	NaN	2.15	9.41	5.03	1.06	21.67	0.39		
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87		
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90		
GEN	0.55	0.00	1.20	0.00	3.38	NaN	0.00	0.00	0.00		
GG	NaN	NaN	NaN	NaN	0.00	NaN	NaN	NaN	NaN		
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02		
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13		
NG	NaN	NaN	0.00	NaN	NaN	NaN	NaN	NaN	NaN		
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27		
PCFX	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00	NaN		
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57		
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59		
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10		
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15		
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39		
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76		
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00		
SCD	NaN	NaN	NaN	0.00	0.36	NaN	0.00	0.00	NaN		
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89		
TG16	NaN	0.00	NaN	NaN	NaN	NaN	NaN	NaN	0.00		
WS	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00	NaN		
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98		
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71		
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29		
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94		
XOne	11.47	1.08	0.52	1.82	0.29	NaN	4.16	3.06	15.27		

In [478...]: data.pivot_table(values="EU_Sales", index="Platform", columns="Genre", aggfunc="sum")

Out[478]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Strategy
Platform											
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	0.00	1.31		
3DO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33		
DC	0.23	0.24	0.00	0.00	0.61	0.00	0.51	0.00	0.00	0.00	
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59		
GB	2.11	3.50	0.00	2.15	9.41	5.03	1.06	21.67	0.39		
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87		
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90		
GEN	0.55	0.00	1.20	0.00	3.38	0.00	0.00	0.00	0.00	0.00	
GG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02		
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13		
NG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27		
PCFX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57		
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59		
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10		
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15		
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39		
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76		
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00	0.00	
SCD	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89		
TG16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98		
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71		
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29		
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94		
XOne	11.47	1.08	0.52	1.82	0.29	0.00	4.16	3.06	15.27		

In [480...]: data.pivot_table(values="EU_Sales", index="Platform", columns="Genre", aggfunc="sum")

Out [480]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter
Platform										
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	0.00	1.31	
3DO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33	
DC	0.23	0.24	0.00	0.00	0.61	0.00	0.51	0.00	0.00	
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59	
GB	2.11	3.50	0.00	2.15	9.41	5.03	1.06	21.67	0.39	
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87	
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90	
GEN	0.55	0.00	1.20	0.00	3.38	0.00	0.00	0.00	0.00	
GG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02	
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13	
NG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27	
PCFX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57	
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59	
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10	
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15	
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39	
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76	
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00	
SCD	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89	
TG16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98	
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71	
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29	
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94	
XOne	11.47	1.08	0.52	1.82	0.29	0.00	4.16	3.06	15.27	
All	516.48	63.74	100.00	211.77	200.65	50.52	236.31	187.57	310.45	

In [482...]

```
data.pivot_table(values="EU_Sales", index="Platform", columns="Genre", aggfunc='sum')
```

Out [482]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter
Platform										
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	0.00	1.31	
3DO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33	
DC	0.23	0.24	0.00	0.00	0.61	0.00	0.51	0.00	0.00	
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59	
GB	2.11	3.50	0.00	2.15	9.41	5.03	1.06	21.67	0.39	
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87	
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90	
GEN	0.55	0.00	1.20	0.00	3.38	0.00	0.00	0.00	0.00	
GG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02	
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13	
NG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27	
PCFX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57	
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59	
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10	
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15	
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39	
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76	
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00	
SCD	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89	
TG16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98	
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71	
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29	
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94	
XOne	11.47	1.08	0.52	1.82	0.29	0.00	4.16	3.06	15.27	
Total Sum of Sales	516.48	63.74	100.00	211.77	200.65	50.52	236.31	187.57	310.45	

In [484...]

```
data.groupby(["Platform", "Genre"])["EU_Sales"].sum()
```

```
Out[484]: Platform  Genre
2600      Action     1.47
           Adventure   0.02
           Fighting    0.04
           Misc        0.20
           Platform    0.72
...
XOne      Role-Playing 3.06
           Shooter    15.27
           Simulation  0.21
           Sports      7.67
           Strategy    0.10
Name: EU_Sales, Length: 293, dtype: float64
```

```
In [486...]: data.groupby(["Platform", "Genre"])["EU_Sales"].sum().unstack()
```

Out[486]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Strategy
Platform										
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	NaN	1.31	
3DO	NaN	0.00	NaN	NaN	NaN	0.00	NaN	NaN	NaN	NaN
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33	
DC	0.23	0.24	0.00	NaN	0.61	NaN	0.51	0.00	0.00	
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59	
GB	2.11	3.50	NaN	2.15	9.41	5.03	1.06	21.67	0.39	
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87	
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90	
GEN	0.55	0.00	1.20	0.00	3.38	NaN	0.00	0.00	0.00	
GG	NaN	NaN	NaN	NaN	0.00	NaN	NaN	NaN	NaN	
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02	
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13	
NG	NaN	NaN	0.00	NaN	NaN	NaN	NaN	NaN	NaN	
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27	
PCFX	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00	NaN	
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57	
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59	
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10	
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15	
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39	
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76	
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00	
SCD	NaN	NaN	NaN	0.00	0.36	NaN	0.00	0.00	NaN	
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89	
TG16	NaN	0.00	NaN	NaN	NaN	NaN	NaN	NaN	0.00	
WS	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00	NaN	
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98	
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71	
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29	
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94	
XOne	11.47	1.08	0.52	1.82	0.29	NaN	4.16	3.06	15.27	

In [487...]: data.groupby(["Platform", "Genre"])["EU_Sales"].sum().unstack().fillna(0)

Out[487]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Strategy
Platform										
2600	1.47	0.02	0.04	0.20	0.72	0.80	0.13	0.00	1.31	
3DO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3DS	12.33	0.80	2.20	2.13	10.35	2.11	4.58	13.00	0.33	
DC	0.23	0.24	0.00	0.00	0.61	0.00	0.51	0.00	0.00	
DS	26.70	10.45	0.32	35.65	18.96	26.21	10.06	18.30	0.59	
GB	2.11	3.50	0.00	2.15	9.41	5.03	1.06	21.67	0.39	
GBA	14.36	3.29	1.07	7.18	18.79	2.49	5.04	12.87	0.87	
GC	7.65	1.26	2.91	2.56	5.95	0.89	4.82	2.44	2.90	
GEN	0.55	0.00	1.20	0.00	3.38	0.00	0.00	0.00	0.00	
GG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
N64	6.32	0.05	3.70	1.44	7.59	0.57	8.29	0.35	4.02	
NES	3.34	0.50	0.66	0.00	10.19	1.98	1.23	0.00	1.13	
NG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PC	17.34	7.65	0.12	2.47	0.33	0.68	2.85	25.28	21.27	
PCFX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PS	44.63	7.66	20.88	13.52	21.64	2.37	34.97	12.42	13.57	
PS2	71.34	5.09	22.41	29.34	23.21	1.93	46.61	18.12	33.59	
PS3	109.26	8.13	14.69	16.47	10.90	0.05	33.36	19.79	75.10	
PS4	38.19	2.19	2.73	3.03	3.32	0.02	7.12	10.55	33.15	
PSP	16.95	0.92	4.52	1.42	5.36	1.26	11.77	3.76	5.39	
PSV	5.68	0.65	0.70	1.28	1.42	0.05	1.32	1.64	1.76	
SAT	0.00	0.00	0.38	0.00	0.00	0.00	0.16	0.00	0.00	
SCD	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	
SNES	1.33	0.00	2.90	0.54	10.74	0.00	1.75	0.16	0.89	
TG16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Wii	30.58	4.59	5.11	65.00	24.08	3.60	19.97	1.95	5.98	
WiiU	6.59	0.08	1.43	3.49	6.16	0.36	2.46	0.62	1.71	
X360	75.85	4.86	8.92	20.20	4.19	0.04	25.43	18.55	76.29	
XB	12.21	0.73	2.59	1.88	2.70	0.08	8.66	3.04	14.94	
XOne	11.47	1.08	0.52	1.82	0.29	0.00	4.16	3.06	15.27	

In [488]: pd.crosstab(data.Decade, data.Genre)

Out[488]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Sit
Decade											
80s	66	2	4	8	33	19	8	9	30		
90s	162	97	193	116	125	71	183	172	137		
00s	1585	633	442	999	567	365	801	732	720		
10s	1438	542	197	563	150	115	233	557	395		

In [489]: pd.crosstab(index=data.Decade, columns=data.Genre, values=data.EU_Sales, aggfunc='sum')

Out[489]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Sit
Decade											
80s	4.29	0.52	0.69	0.20	13.24	5.43	1.36	0.00	2.83		
90s	40.12	13.18	23.80	13.69	46.15	4.60	41.11	32.55	17.67		
00s	235.80	30.95	54.64	129.89	102.59	33.72	138.33	81.27	123.51		
10s	236.27	19.09	20.87	67.99	38.67	6.77	55.51	73.75	166.44		

In [490]: data.groupby(["Decade", "Genre"])["EU_Sales"].sum().unstack()

Out[490]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Sit
Decade											
80s	4.29	0.52	0.69	0.20	13.24	5.43	1.36	0.00	2.83		
90s	40.12	13.18	23.80	13.69	46.15	4.60	41.11	32.55	17.67		
00s	235.80	30.95	54.64	129.89	102.59	33.72	138.33	81.27	123.51		
10s	236.27	19.09	20.87	67.99	38.67	6.77	55.51	73.75	166.44		

In [491]: pd.crosstab(index=data.Decade, columns=data.Genre, values=data.EU_Sales, aggfunc='sum')

Out[491]:

	Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Sit
Decade											
80s	0.001783	0.000216	0.000287	0.000083	0.005501	0.002256	0.000565	0.000000	0.000000		
90s	0.016670	0.005476	0.009889	0.005688	0.019176	0.001911	0.017082	0.013525	0.013525		
00s	0.097977	0.012860	0.022703	0.053970	0.042627	0.014011	0.057477	0.033768	0.033768		
10s	0.098172	0.007932	0.008672	0.028250	0.016068	0.002813	0.023065	0.030644	0.030644		

In [492]: genre_sales = pd.crosstab(index=data.Decade, columns=data.Genre, values=data.EU_Sales, aggfunc='sum')

In [493]: genre_sales

Out[493]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Simulation
Decade										
80s	4.29	0.52	0.69	0.20	13.24	5.43	1.36	0.00	2.83	1.00
90s	40.12	13.18	23.80	13.69	46.15	4.60	41.11	32.55	17.67	1.00
00s	235.80	30.95	54.64	129.89	102.59	33.72	138.33	81.27	123.51	1.00
10s	236.27	19.09	20.87	67.99	38.67	6.77	55.51	73.75	166.44	1.00

In [494...]: genre_sales.columns

Out[494]: Index(['Action', 'Adventure', 'Fighting', 'Misc', 'Platform', 'Puzzle', 'Racing', 'Role-Playing', 'Shooter', 'Simulation', 'Sports', 'Strategy'], dtype='object', name='Genre')

In [495...]: genre_sales.index

Out[495]: CategoricalIndex(['80s', '90s', '00s', '10s'], categories=['80s', '90s', '00s', '10s'], ordered=True, dtype='category', name='Decade')

In [496...]: genre_sales

Out[496]:

Genre	Action	Adventure	Fighting	Misc	Platform	Puzzle	Racing	Role-Playing	Shooter	Simulation
Decade										
80s	4.29	0.52	0.69	0.20	13.24	5.43	1.36	0.00	2.83	1.00
90s	40.12	13.18	23.80	13.69	46.15	4.60	41.11	32.55	17.67	1.00
00s	235.80	30.95	54.64	129.89	102.59	33.72	138.33	81.27	123.51	1.00
10s	236.27	19.09	20.87	67.99	38.67	6.77	55.51	73.75	166.44	1.00

In [502...]: genre_sales.reset_index().melt(id_vars="Decade", value_vars=['Action', 'Adventure', 'Fighting', 'Misc', 'Platform', 'Puzzle', 'Racing', 'Role-Playing', 'Shooter', 'Simulation'])

Out [502]:

	Decade	Genre	value
0	80s	Action	4.29
1	90s	Action	40.12
2	00s	Action	235.80
3	10s	Action	236.27
4	80s	Adventure	0.52
5	90s	Adventure	13.18
6	00s	Adventure	30.95
7	10s	Adventure	19.09
8	80s	Fighting	0.69
9	90s	Fighting	23.80
10	00s	Fighting	54.64
11	10s	Fighting	20.87
12	80s	Misc	0.20
13	90s	Misc	13.69
14	00s	Misc	129.89
15	10s	Misc	67.99
16	80s	Platform	13.24
17	90s	Platform	46.15
18	00s	Platform	102.59
19	10s	Platform	38.67
20	80s	Puzzle	5.43
21	90s	Puzzle	4.60
22	00s	Puzzle	33.72
23	10s	Puzzle	6.77
24	80s	Racing	1.36
25	90s	Racing	41.11
26	00s	Racing	138.33
27	10s	Racing	55.51
28	80s	Role-Playing	0.00
29	90s	Role-Playing	32.55
30	00s	Role-Playing	81.27
31	10s	Role-Playing	73.75
32	80s	Shooter	2.83
33	90s	Shooter	17.67
34	00s	Shooter	123.51
35	10s	Shooter	166.44
36	80s	Simulation	0.07

Decade		Genre	value
37	90s	Simulation	8.58
38	00s	Simulation	79.14
39	10s	Simulation	25.23
40	80s	Sports	2.57
41	90s	Sports	29.18
42	00s	Sports	223.94
43	10s	Sports	115.65
44	80s	Strategy	0.00
45	90s	Strategy	12.24
46	00s	Strategy	20.30
47	10s	Strategy	12.30