

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
sns.set(style="darkgrid")
```

In [2]:

```
pd.__version__
```

Out[2]:

'1.5.3'

In [3]:

```
data = pd.read_csv('vgsales.csv')
```

In [72]:

```
data.head(10)
```

Out[72]:

	Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
0	1	Wii Sports	Wii	2006.0	Sports	Nintendo	41.49	29.02	3.77	8.46	82.74
1	2	Super Mario Bros.	NES	1985.0	Platform	Nintendo	29.08	3.58	6.81	0.77	40.24
2	3	Mario Kart Wii	Wii	2008.0	Racing	Nintendo	15.85	12.88	3.79	3.31	35.82
3	4	Wii Sports Resort	Wii	2009.0	Sports	Nintendo	15.75	11.01	3.28	2.96	33.00
4	5	Pokemon Red/Pokemon Blue	GB	1996.0	Role-Playing	Nintendo	11.27	8.89	10.22	1.00	31.37
5	6	Tetris	GB	1989.0	Puzzle	Nintendo	23.20	2.26	4.22	0.58	30.26
6	7	New Super Mario Bros.	DS	2006.0	Platform	Nintendo	11.38	9.23	6.50	2.90	30.01
7	8	Wii Play	Wii	2006.0	Misc	Nintendo	14.03	9.20	2.93	2.85	29.02
8	9	New Super Mario Bros. Wii	Wii	2009.0	Platform	Nintendo	14.59	7.06	4.70	2.26	28.62
9	10	Duck Hunt	NES	1984.0	Shooter	Nintendo	26.93	0.63	0.28	0.47	28.31

In []:

```
data.sample(10).T
```

Out[]:

	9917	6938	4062	14170	10233	7223	15214	4513	125
Rank	9919	6940	4064	14172	10235	7225	15217	4515	125
Name	USA Today Crossword Challenge	Sesame Street: Elmo's Number Journey	Sniper: Art of Victory	Red Faction II	GunGriffon Blaze	ECW Hardcore Revolution	Moujuutsukai to Oujisama Portable	Minecraft	Power F Succes Leger
Platform	DS	PS	PC	GC	PS2	N64	PSP	WiiU	P
Year	2008.0	1998.0	2008.0	2003.0	2000.0	2000.0	2011.0	2016.0	201
Genre	Puzzle	Misc	Shooter	Shooter	Simulation	Fighting	Adventure	Misc	Spo

	9917	6938	4062	14170	10233	7223	15214	4519	1025
Publisher	Destineer	NewKidCo	Interactive	THQ	Entertainment	Entertainment	Idea Factory	Game Studios	Digi
NA_Sales	0.11	0.13	0.0	0.03	0.05	0.18	0.0	0.18	
EU_Sales	0.0	0.09	0.45	0.01	0.04	0.04	0.0	0.09	
JP_Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.14	0
Other_Sales	0.01	0.02	0.03	0.0	0.01	0.0	0.0	0.03	
Global_Sales	0.12	0.24	0.49	0.03	0.11	0.22	0.02	0.43	0

In []:

```
data.tail(25)
```

Out[]:

	Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global
16573	16576	Mini Desktop Racing	Wii	2007.0	Racing	Popcorn Arcade	0.01	0.00	0.00	0.0	
16574	16577	Yattaman Wii: BikkuriDokkiri Machine de Mou Ra...	Wii	2008.0	Racing	Takara Tomy	0.00	0.00	0.01	0.0	
16575	16578	Neo Angelique Special	PSP	2008.0	Adventure	Tecmo Koei	0.00	0.00	0.01	0.0	
16576	16579	Rugby Challenge 3	XOne	2016.0	Sports	Alternative Software	0.00	0.01	0.00	0.0	
16577	16580	Damnation	PC	2009.0	Shooter	Codemasters	0.00	0.01	0.00	0.0	
16578	16581	Outdoors Unleashed: Africa 3D	3DS	2011.0	Sports	Mastiff	0.01	0.00	0.00	0.0	
16579	16582	PGA European Tour	N64	2000.0	Sports	Infogrames	0.01	0.00	0.00	0.0	
16580	16583	Real Rode	PS2	2008.0	Adventure	Kadokawa Shoten	0.00	0.00	0.01	0.0	
16581	16584	Fit & Fun	Wii	2011.0	Sports	Unknown	0.00	0.01	0.00	0.0	
16582	16585	Planet Monsters	GBA	2001.0	Action	Titus	0.01	0.00	0.00	0.0	
16583	16586	Carmageddon 64	N64	1999.0	Action	Virgin Interactive	0.01	0.00	0.00	0.0	
16584	16587	Bust-A-Move 3000	GC	2003.0	Puzzle	Ubisoft	0.01	0.00	0.00	0.0	
16585	16588	Breach	PC	2011.0	Shooter	Destineer	0.01	0.00	0.00	0.0	
16586	16589	Secret Files 2: Puritas Cordis	DS	2009.0	Adventure	Deep Silver	0.00	0.01	0.00	0.0	
16587	16590	Mezase!! Tsuru Master DS	DS	2009.0	Sports	Hudson Soft	0.00	0.00	0.01	0.0	
16588	16591	Mega Brain Boost	DS	2008.0	Puzzle	Majesco Entertainment	0.01	0.00	0.00	0.0	
16589	16592	Chou Ezaru wa Akai Hana: Koi wa Tsuki ni Shiru...	PSV	2016.0	Action	dramatic create	0.00	0.00	0.01	0.0	
16590	16593	Eiyuu Densetsu: Sora no Kiseki	PSP	2007.0	Role-	Falcom	0.00	0.00	0.01	0.0	

Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global
16591	Myst IV: Revelation	PC	2004.0	Adventure	Ubisoft	0.01	0.00	0.00	0.0	
16592	Plushees	DS	2008.0	Simulation	Destineer	0.01	0.00	0.00	0.0	
16593	Woody Woodpecker in Crazy Castle 5	GBA	2002.0	Platform	Kemco	0.01	0.00	0.00	0.0	
16594	Men in Black II: Alien Escape	GC	2003.0	Shooter	Infogrames	0.01	0.00	0.00	0.0	
16595	SCORE International Baja 1000: The Official Game	PS2	2008.0	Racing	Activision	0.00	0.00	0.00	0.0	
16596	Know How 2	DS	2010.0	Puzzle	7G//AMES	0.00	0.01	0.00	0.0	
16597	Spirits & Spells	GBA	2003.0	Platform	Wanadoo	0.01	0.00	0.00	0.0	

In [67]:

```
data.shape
```

Out[67]:

```
(16598, 11)
```

In [68]:

```
data.columns
```

Out[68]:

```
Index(['Rank', 'Name', 'Platform', 'Year', 'Genre', 'Publisher', 'NA_Sales',
      'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global_Sales'],
      dtype='object')
```

In [69]:

```
data.info
```

Out[69]:

```
<bound method DataFrame.info of
Name Platform \
0          1          Wii Sports          Wii
1          2      Super Mario Bros.      NES
2          3      Mario Kart Wii        Wii
3          4      Wii Sports Resort      Wii
4          5      Pokemon Red/Pokemon Blue  GB
...      ...
16593  16596      Woody Woodpecker in Crazy Castle 5  GBA
16594  16597      Men in Black II: Alien Escape      GC
16595  16598  SCORE International Baja 1000: The Official Game  PS2
16596  16599      Know How 2          DS
16597  16600      Spirits & Spells          GBA

      Year      Genre  Publisher  NA_Sales  EU_Sales  JP_Sales  \
0      2006.0      Sports    Nintendo    41.49    29.02    3.77
1      1985.0      Platform    Nintendo    29.08     3.58    6.81
2      2008.0      Racing    Nintendo    15.85    12.88    3.79
3      2009.0      Sports    Nintendo    15.75    11.01    3.28
4      1996.0  Role-Playing    Nintendo    11.27     8.89   10.22
...      ...      ...      ...      ...      ...      ...
16593  2002.0      Platform      Kemco     0.01     0.00     0.00
16594  2003.0      Shooter  Infogrames     0.01     0.00     0.00
```

16595	2008.0	Racing	Activision	0.00	0.00	0.00
16596	2010.0	Puzzle	7G//AMES	0.00	0.01	0.00
16597	2003.0	Platform	Wanadoo	0.01	0.00	0.00

	Other_Sales	Global_Sales
0	8.46	82.74
1	0.77	40.24
2	3.31	35.82
3	2.96	33.00
4	1.00	31.37
...
16593	0.00	0.01
16594	0.00	0.01
16595	0.00	0.01
16596	0.00	0.01
16597	0.00	0.01

[16598 rows x 11 columns]>

In [74]:

```
data.describe
```

Out[74]:

```
<bound method NDFrame.describe of
Name Platform \
0          1
1          2
2          3
3          4
4          5
...
16593 16596
16594 16597
16595 16598
16596 16599
16597 16600
Rank
Wii Sports
Super Mario Bros.
Mario Kart Wii
Wii Sports Resort
Pokemon Red/Pokemon Blue
GBA
Woody Woodpecker in Crazy Castle 5
Men in Black II: Alien Escape
SCORE International Baja 1000: The Official Game
Know How 2
Spirits & Spells
GBA

Year      Genre      Publisher  NA_Sales  EU_Sales  JP_Sales  \
0    2006.0    Sports    Nintendo    41.49    29.02     3.77
1    1985.0    Platform    Nintendo    29.08     3.58     6.81
2    2008.0    Racing     Nintendo    15.85    12.88     3.79
3    2009.0    Sports     Nintendo    15.75    11.01     3.28
4    1996.0    Role-Playing Nintendo    11.27     8.89    10.22
...
16593 2002.0    Platform    Kemco      0.01     0.00     0.00
16594 2003.0    Shooter     Infogrames  0.01     0.00     0.00
16595 2008.0    Racing     Activision  0.00     0.00     0.00
16596 2010.0    Puzzle      7G//AMES    0.00     0.01     0.00
16597 2003.0    Platform    Wanadoo     0.01     0.00     0.00

Other_Sales  Global_Sales
0          8.46      82.74
1          0.77      40.24
2          3.31      35.82
3          2.96      33.00
4          1.00      31.37
...
16593      0.00       0.01
16594      0.00       0.01
16595      0.00       0.01
16596      0.00       0.01
16597      0.00       0.01
```

[16598 rows x 11 columns]>

In [75]:

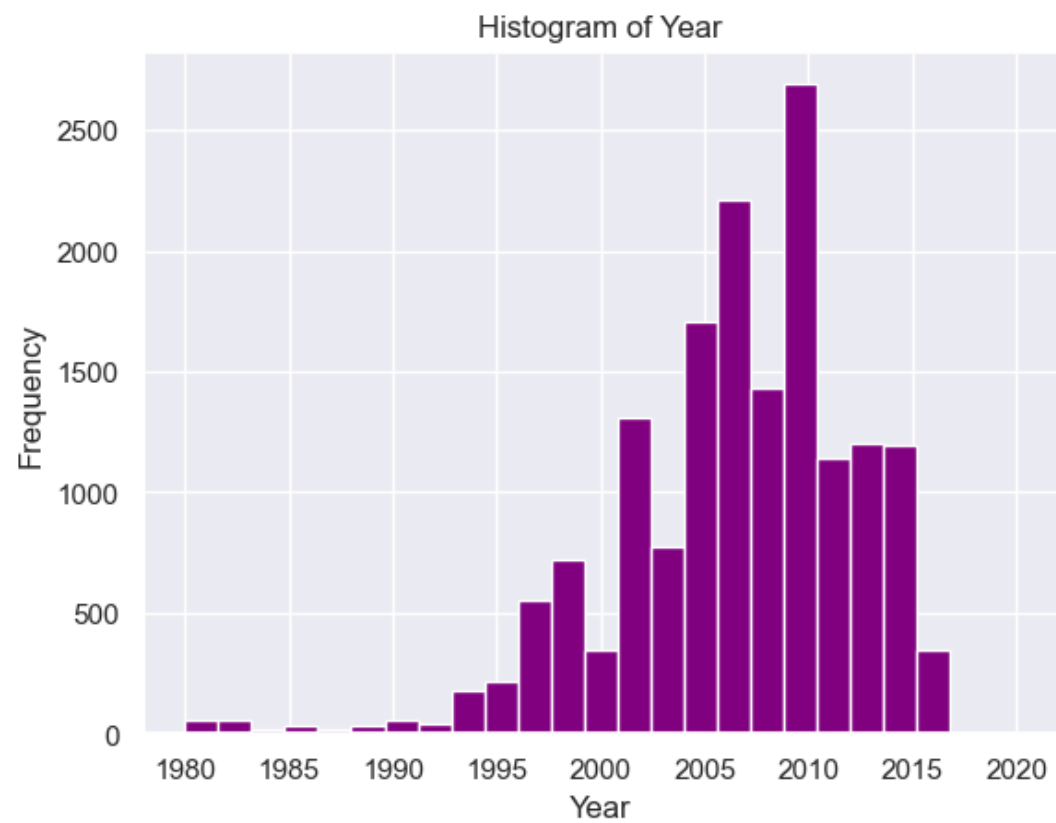
```
data.describe(include=[object])
```

Out[75]:

	Name	Platform	Genre	Publisher
count	16598	16598	16598	16540
unique	11493	31	12	578
top	Need for Speed: Most Wanted		DS Action	Electronic Arts
freq	12	2163	3316	1351

In [124]:

```
data.Year.hist(bins=25, color='purple')
plt.title('Histogram of Year')
plt.xlabel('Year')
plt.ylabel('Frequency')
plt.show()
plt.savefig("Histograme.png")
```



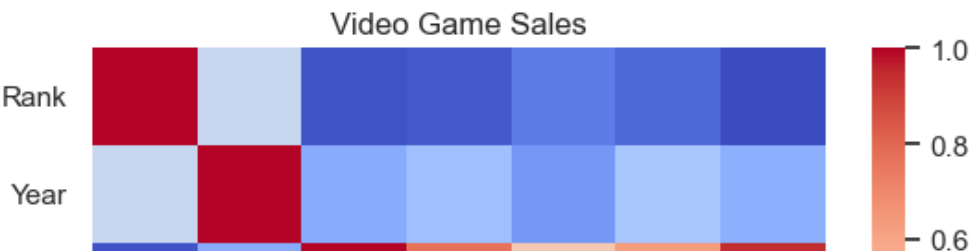
<Figure size 640x480 with 0 Axes>

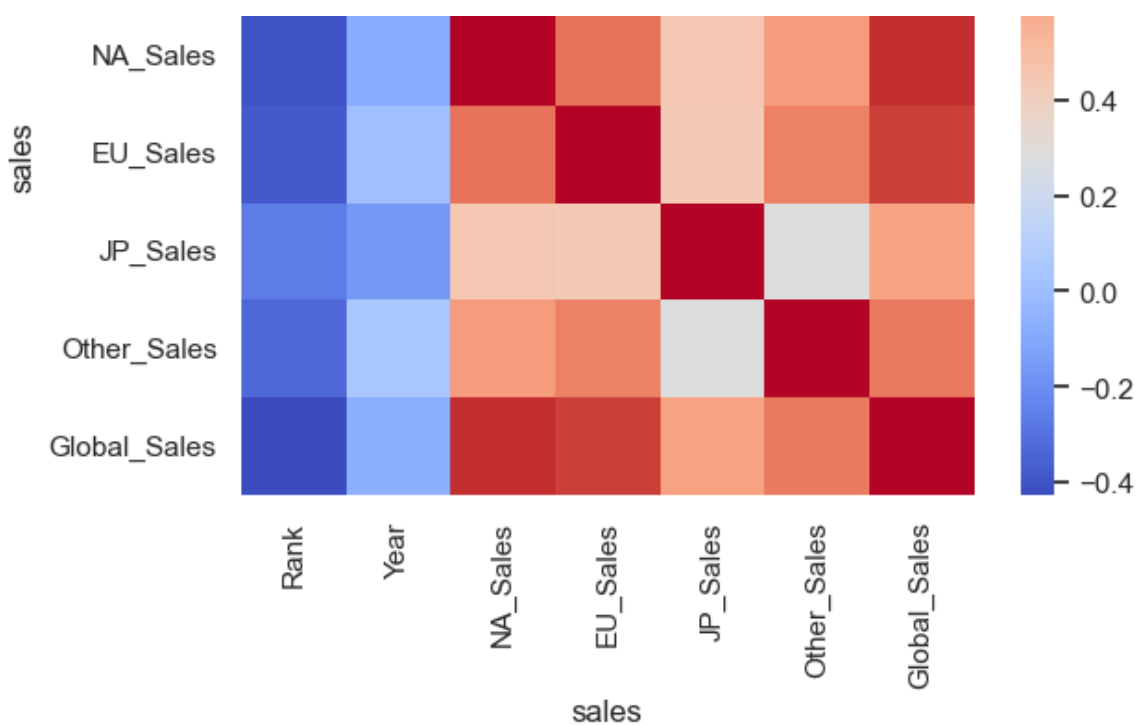
In [78]:

```
sns.heatmap(data.corr(), cmap='coolwarm')
plt.title('Video Game Sales')
plt.xlabel('sales')
plt.ylabel('sales')
plt.savefig("Heatmap.png")
```

C:\Users\main_user_khaled\AppData\Local\Temp\ipykernel_4504\3740206616.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version , it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

sns.heatmap(data.corr(), cmap='coolwarm')



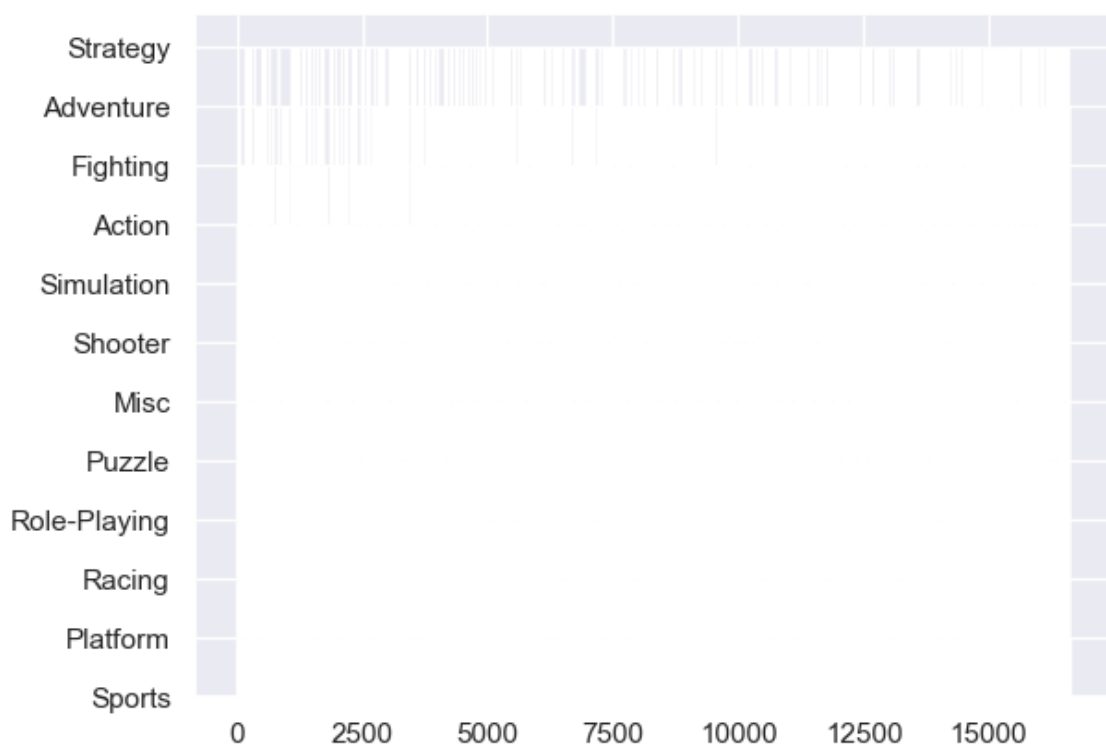


In [95]:

```
Rank = data['Rank']
Genre = data['Genre']
plt.figure(figsize=(20, 60))
plt.bar(Rank, Genre, color='blue')
plt.title('Video Game Sales by Category')
plt.xlabel('Category')
plt.ylabel('Sales (in millions)')
```

Out[95]:

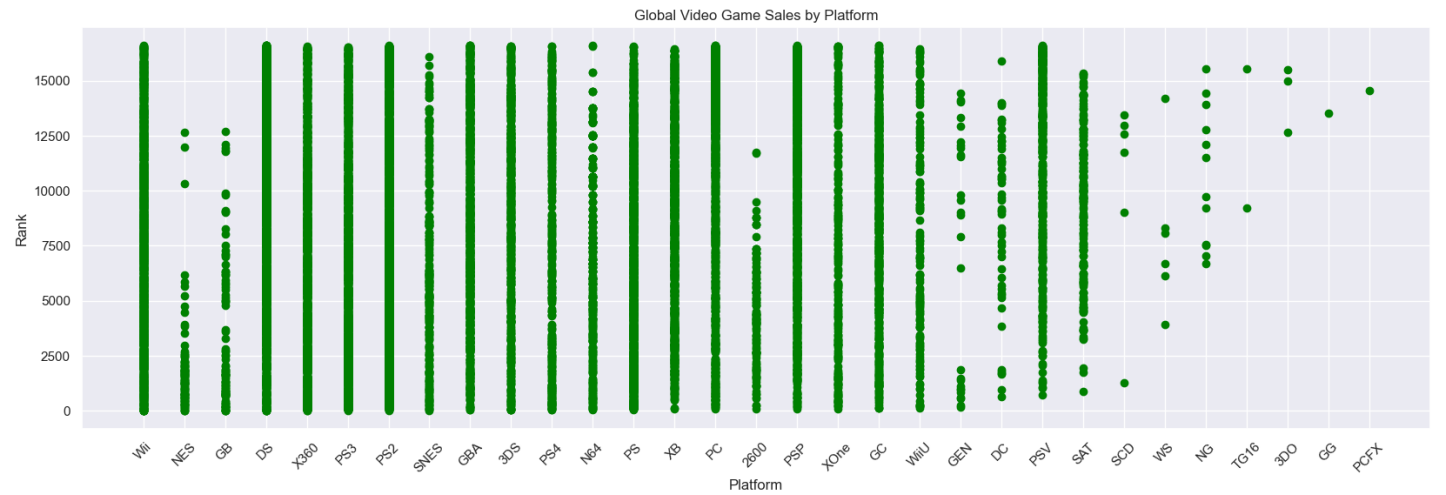
<BarContainer object of 16598 artists>



In [122]:

```
Platform = data['Platform']
plt.figure(figsize=(20, 6))
plt.scatter(Platform, Rank, color='Green')
plt.title('Global Video Game Sales by Platform')
plt.xlabel('Platform')
```

```
plt.ylabel('Rank')
plt.xticks(rotation=45)
plt.show()
```



<Figure size 640x480 with 0 Axes>

In [123]:

```
plt.savefig("Dots.png")
```

<Figure size 640x480 with 0 Axes>

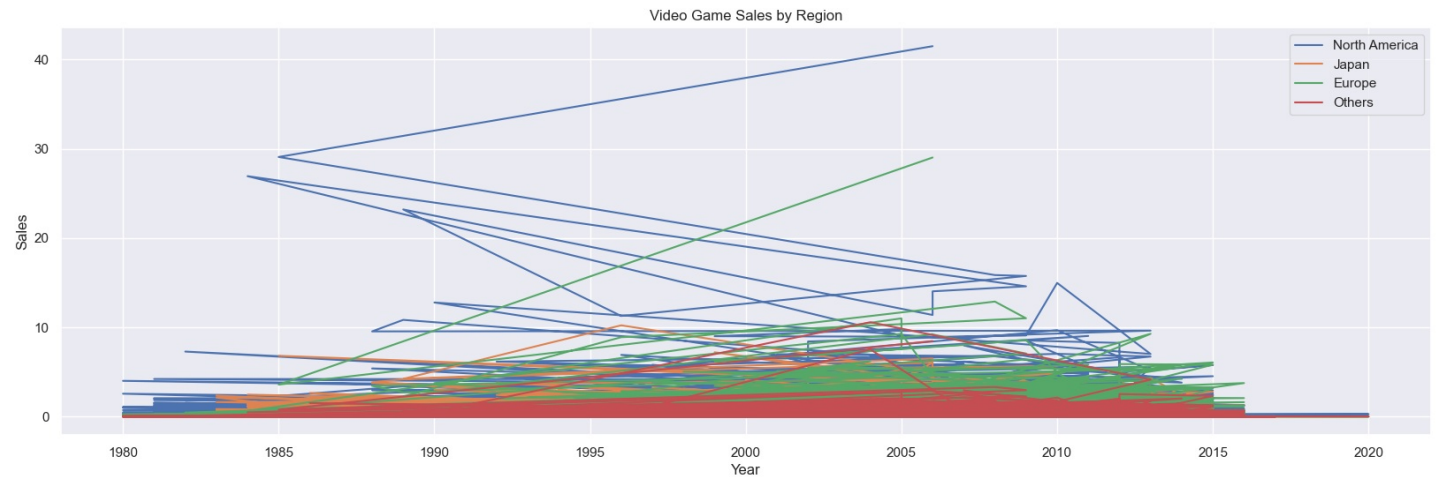
In [80]:

```
NA = data['NA_Sales']
JP = data['JP_Sales']
EU = data['EU_Sales']
Other = data['Other_Sales']

Year = data['Year']

plt.figure(figsize=(20, 6))
plt.plot(Year, NA, label='North America')
plt.plot(Year, JP, label='Japan')
plt.plot(Year, EU, label='Europe')
plt.plot(Year, Other, label='Others')

plt.title('Video Game Sales by Region')
plt.xlabel('Year')
plt.ylabel('Sales')
plt.legend()
plt.savefig("HorzinatalLines.png")
```



In [81]:

```
data.Publisher.unique()
```

Out[81]:

```
array(['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',
nan, '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', 'Ultravision',
'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', 'Kalypso Media',
'Starfish', 'Zushi Games', 'Jorudan', 'Destination Software, Inc',
'New', 'Brash Entertainment', 'ITT Family Games', 'PopCap Games',
'Home Entertainment Suppliers', 'Ackkstudios', 'Starpark Corp.',
'P2 Games', 'BPS', 'Gathering of Developers', 'NewKidCo',
'Storm City Games', 'CokeM Interactive', 'CBS Electronics',
'Magix', 'Marvelous Interactive', '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.', 'Sears',
'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', 'MTO', 'DHM Interactive', 'FunSoft',
'SPS', 'Bohemia Interactive', 'Reef Entertainment',
'Tru Blu Entertainment', 'Moss', 'T&E Soft', 'O-Games',
'Aksys Games', 'NDA Productions', 'Data East',
'Time Warner Interactive', 'Gainax Network Systems', 'Daito',
'O3 Entertainment', 'Gameloft', 'Xicat Interactive',
'Simon & Schuster Interactive', 'Valcon Games', 'PopTop Software',
'TOHO', 'HMH Interactive', '5pb', 'Cave',
'CDV Software Entertainment', 'Microdroids', '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',
'TopWare Interactive', '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',
'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', 'Piacchi', 'Nitroplus',
'Paradox Development', 'Otomate', 'Ongakukan', 'Commseed',
'Inti Creates', 'Takuyo', 'Interchannel-Holon', 'Rain Games',
'UIG Entertainment'], dtype=object)
```

In [12]:

```
NA.sort_values().head(10)
```

Out[12]:

```
11609    0.0
12304    0.0
13775    0.0
10605    0.0
7045     0.0
13772    0.0
13771    0.0
13770    0.0
13769    0.0
13768    0.0
Name: NA_Sales, dtype: float64
```

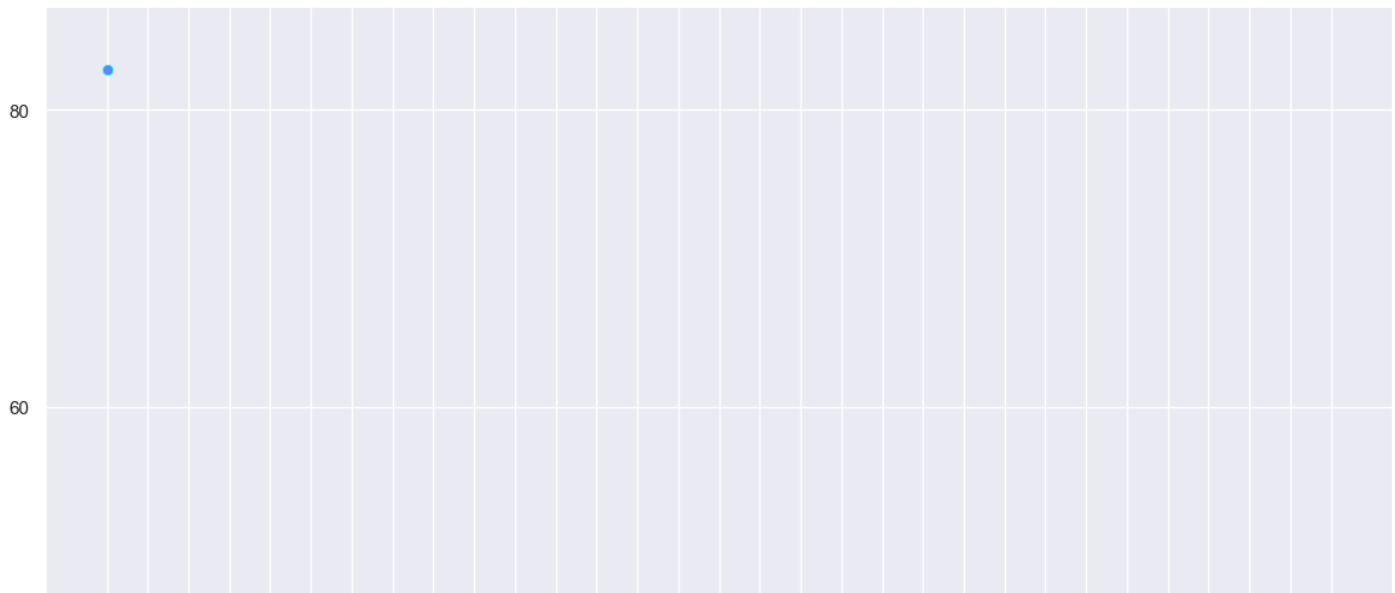
In [82]:

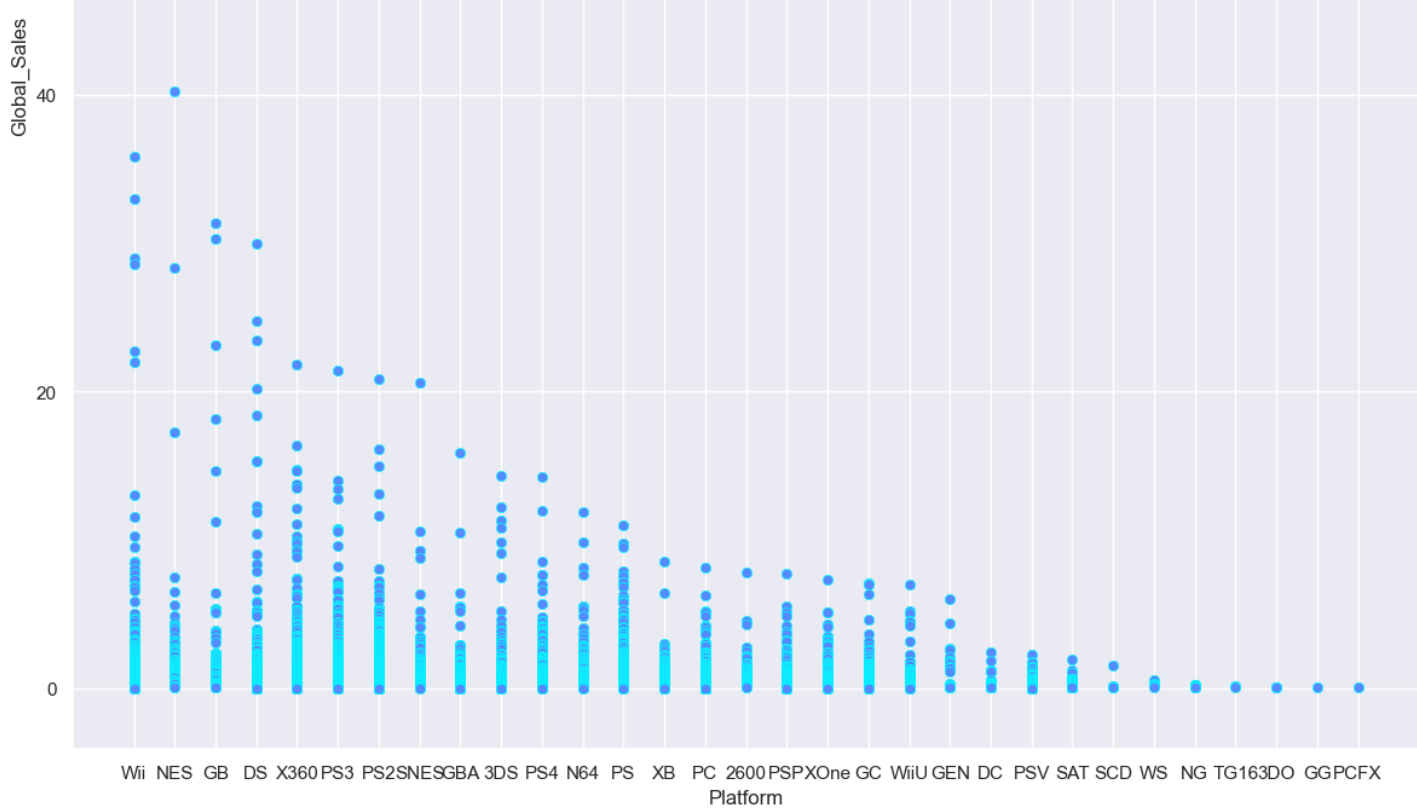
```
sns.relplot(
    x="Platform" ,
    y="Global_Sales" ,
    data=data ,
    height=12 ,
    color='#568AFF',
    palette="CMRmap_r",
    edgecolor='cyan',

)
plt.savefig("snsDots.png")
```

C:\Users\main_user_khaled\AppData\Local\Temp\ipykernel_4504\347145660.py:1: UserWarning: Ignoring `palette` because no `hue` variable has been assigned.

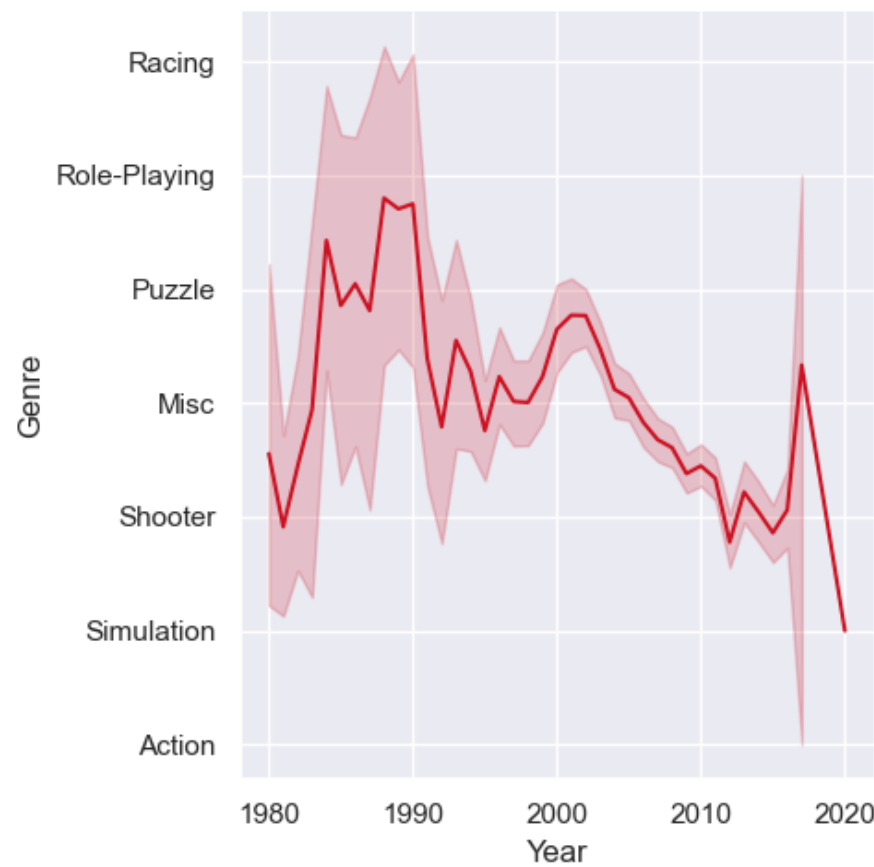
```
sns.relplot(
```





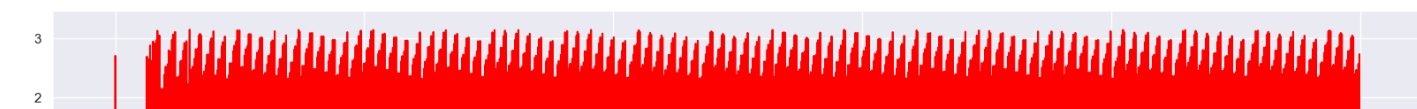
In [90]:

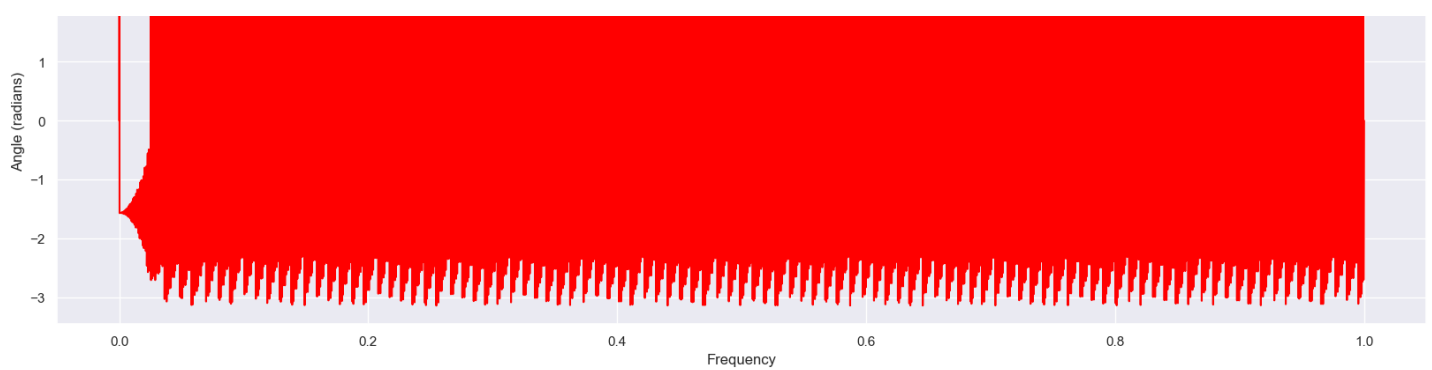
```
sns.relplot(x="Year",y="Genre",data=data,kind="line",markers=True,color='#CC1222')
plt.savefig("Graph.png")
```



In [111]:

```
plt.figure(figsize=(20, 6))
plt.angle_spectrum(data=data,x="Rank",color='red' )
plt.savefig("Spectrum.png")
```

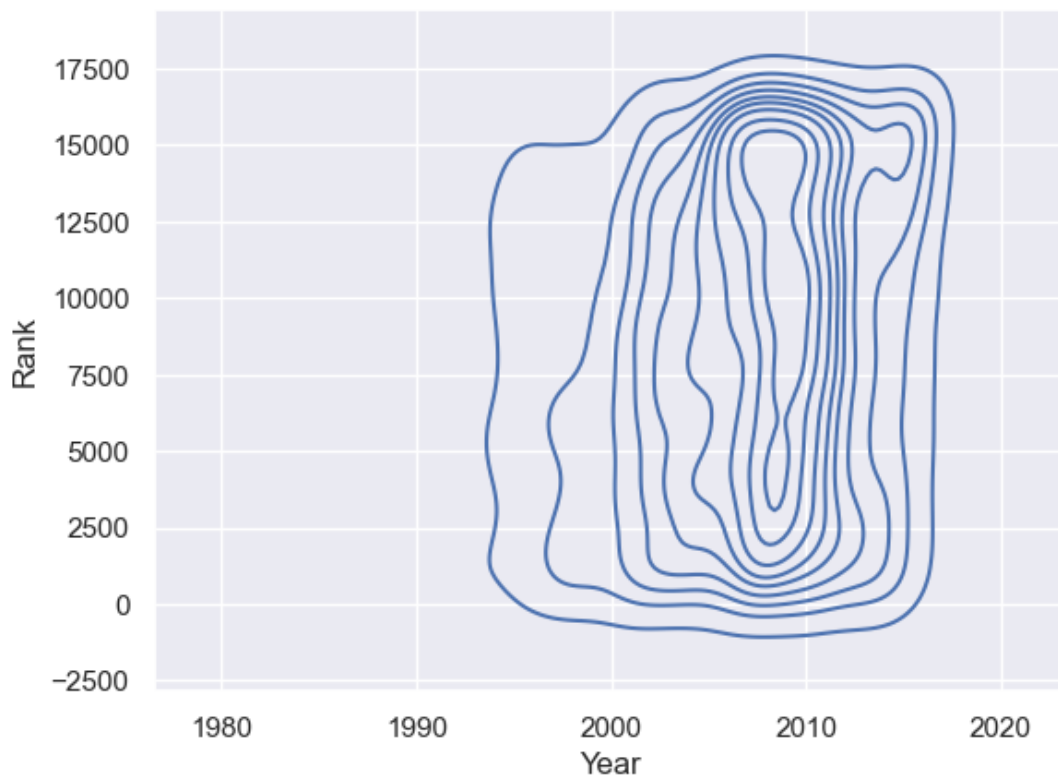




In [6]:

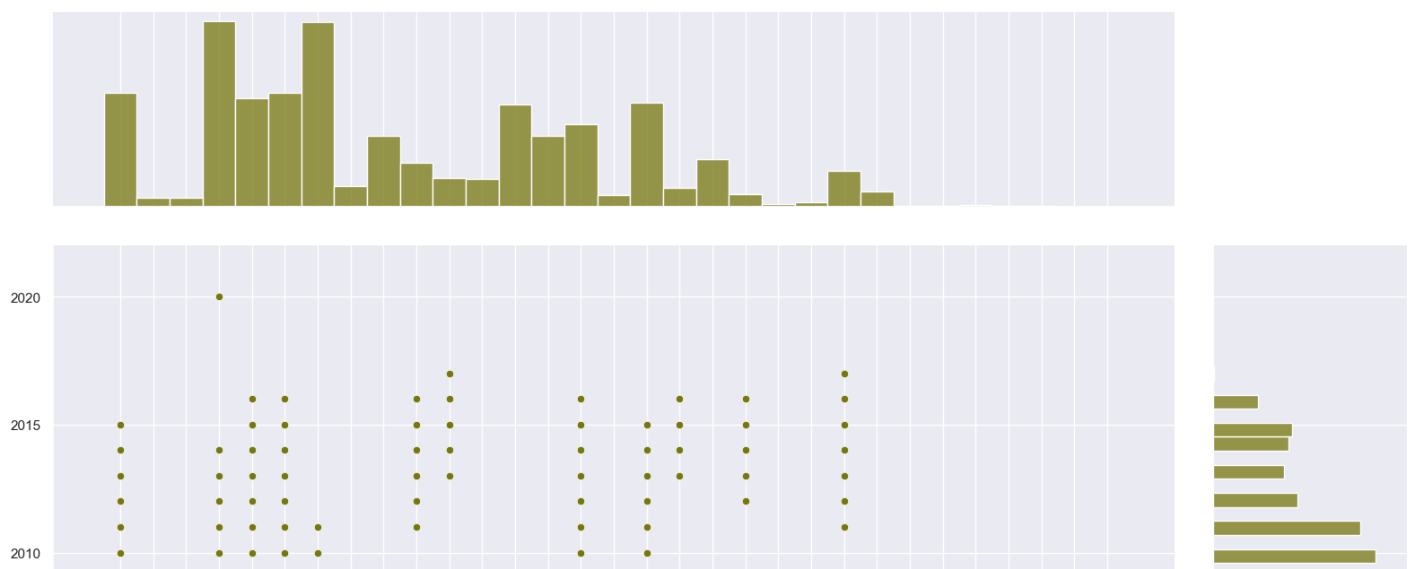
```
sns.kdeplot(x=data["Year"],y=data["Rank"],height=20)
plt.savefig("kdePot.png")
```

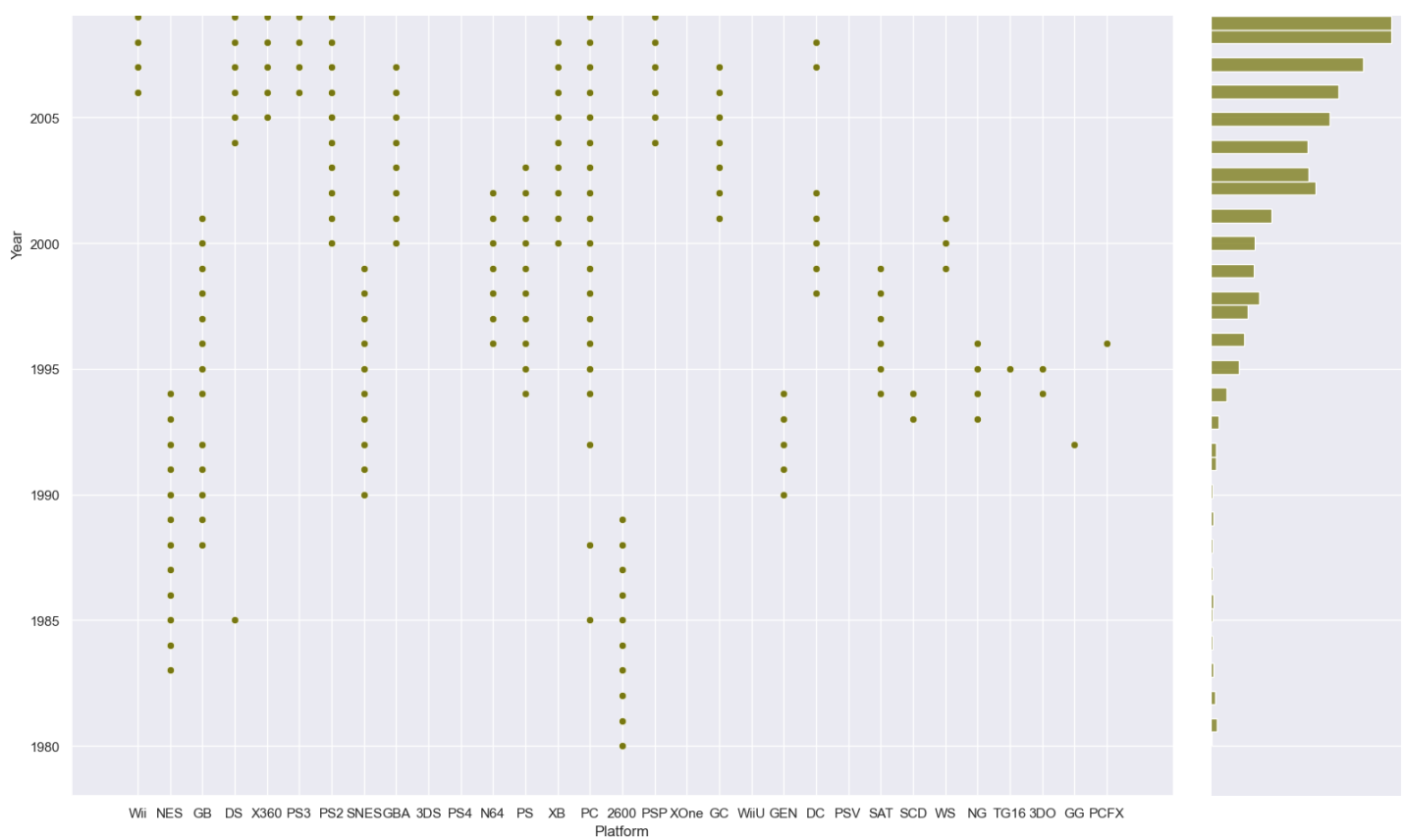
c:\Users\main_user_khaled\anaconda3\lib\site-packages\seaborn\distributions.py:1185: UserWarning: The following kwargs were not used by contour: 'height'
cset = contour_func(



In [27]:

```
sns.jointplot(x="Platform", y="Year", data=data,height=16,color='#777710')
plt.savefig("jointPlot.png")
```





In [7]:

```
newDATA=data.rename(columns={'NA_Sales':'NORTH_AMERICA_SALES','EU_Sales':'Europe_Sales',
'JP_Sales':'Japan_Sales'})
```

In [8]:

```
newDATA
```

Out[8]:

	Rank	Name	Platform	Year	Genre	Publisher	NORTH_AMERICA_SALES	Europe_Sales	Japan_Sales	(
0	1	Wii Sports	Wii	2006.0	Sports	Nintendo	41.49	29.02	3.77	
1	2	Super Mario Bros.	NES	1985.0	Platform	Nintendo	29.08	3.58	6.81	
2	3	Mario Kart Wii	Wii	2008.0	Racing	Nintendo	15.85	12.88	3.79	
3	4	Wii Sports Resort	Wii	2009.0	Sports	Nintendo	15.75	11.01	3.28	
4	5	Pokemon Red/Pokemon Blue	GB	1996.0	Role-Playing	Nintendo	11.27	8.89	10.22	
...	
16593	16596	Woody Woodpecker in Crazy Castle 5	GBA	2002.0	Platform	Kemco	0.01	0.00	0.00	
16594	16597	Men in Black II: Alien Escape	GC	2003.0	Shooter	Infogrames	0.01	0.00	0.00	
16595	16598	SCORE International Baja 1000: The Official Game	PS2	2008.0	Racing	Activision	0.00	0.00	0.00	
16596	16599	Know How 2	DS	2010.0	Puzzle	7G//AMES	0.00	0.01	0.00	
16597	16600	Spirits & Spells	GBA	2003.0	Platform	Wanadoo	0.01	0.00	0.00	

Rank Name Platform Year Genre Publisher NORTH_AMERICA_SALES Europe_Sales Japan_Sales (

16598 rows x 11 columns

In [9]:

data

Out[9]:

	Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sale
0	1	Wii Sports	Wii	2006.0	Sports	Nintendo	41.49	29.02	3.77	8.46	82.7
1	2	Super Mario Bros.	NES	1985.0	Platform	Nintendo	29.08	3.58	6.81	0.77	40.2
2	3	Mario Kart Wii	Wii	2008.0	Racing	Nintendo	15.85	12.88	3.79	3.31	35.8
3	4	Wii Sports Resort	Wii	2009.0	Sports	Nintendo	15.75	11.01	3.28	2.96	33.0
4	5	Pokemon Red/Pokemon Blue	GB	1996.0	Role-Playing	Nintendo	11.27	8.89	10.22	1.00	31.3
...
16593	16596	Woody Woodpecker in Crazy Castle 5	GBA	2002.0	Platform	Kemco	0.01	0.00	0.00	0.00	0.0
16594	16597	Men in Black II: Alien Escape	GC	2003.0	Shooter	Infogrames	0.01	0.00	0.00	0.00	0.0
16595	16598	SCORE International Baja 1000: The Official Game	PS2	2008.0	Racing	Activision	0.00	0.00	0.00	0.00	0.0
16596	16599	Know How 2	DS	2010.0	Puzzle	7G//AMES	0.00	0.01	0.00	0.00	0.0
16597	16600	Spirits & Spells	GBA	2003.0	Platform	Wanadoo	0.01	0.00	0.00	0.00	0.0

16598 rows x 11 columns

In [13]:

```
row=dict({'Rank':16601, 'Name': 'GTA 6', 'Platform': 'Pc', 'Genre': 'Role-Playing', 'Publisher': 'Rockstar Games', 'NORTH_AMERICA_SALES': '50', 'Global_Sales': '100.00'})
newDATA=newDATA.append(row, ignore_index=True)

C:\Users\main_user_khaled\AppData\Local\Temp\ipykernel_19892\1112120226.py:2: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.
  newDATA=newDATA.append(row, ignore_index=True)
```

In [16]:

newDATA.tail(1)

Out[16]:

	Rank	Name	Platform	Year	Genre	Publisher	NORTH_AMERICA_SALES	Europe_Sales	Japan_Sales	Other_Sales
16599	16601	GTA 6	Pc	NaN	Role-Playing	Rockstar Games	50	NaN	NaN	NaN

In [23]:

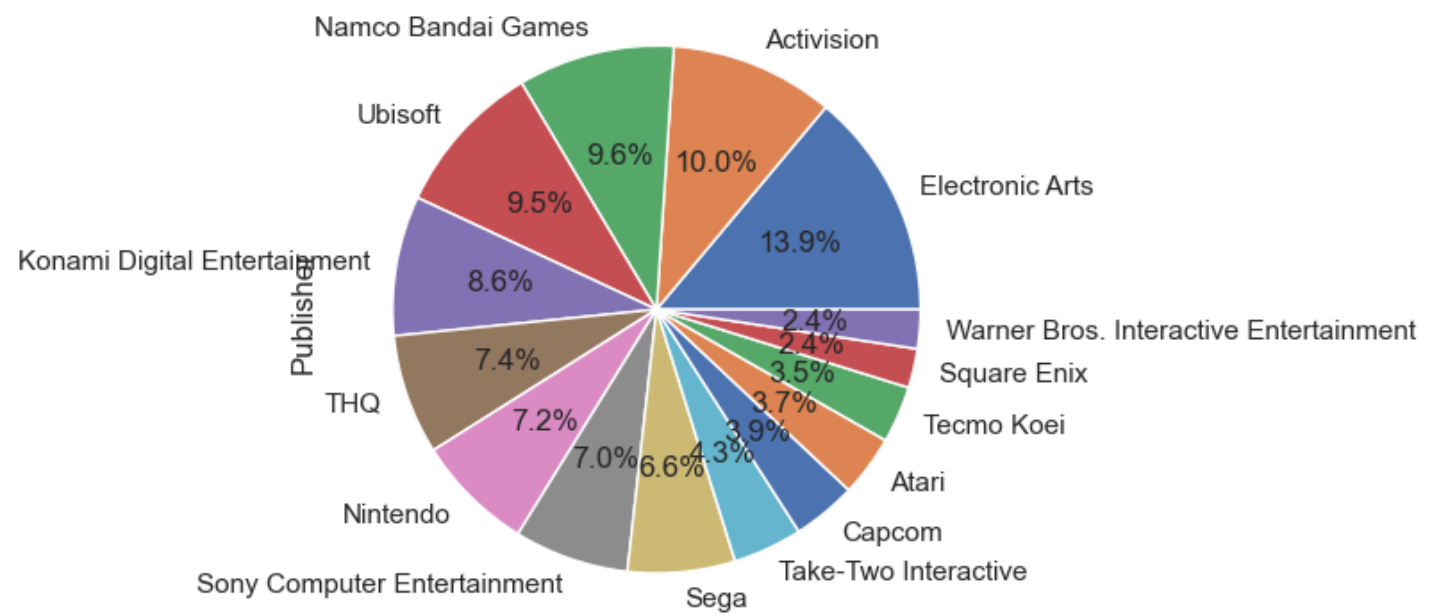
```
newDATA=newDATA.sort_values(by=['Europe_Sales'],ascending=True)
newDATA.head(10)
```

Out[23]:

Rank		Name	Platform	Year	Genre	Publisher	NORTH_AMERICA_SALES	Europe_Sales	Japan_Sales
1708	1710	Pro Yakyuu Family Stadium '88	NES	1988.0	Sports	Namco Bandai Games	0.1	0.0	1.08
7917	7919	Taiko no Tatsujin: Wii U Version!	WiiU	2013.0	Misc	Namco Bandai Games	0.0	0.0	0.19
7924	7926	Pro Yaky? Spirits 4	PS2	2007.0	Sports	Konami Digital Entertainment	0.0	0.0	0.19
7927	7929	Daigasso! Band Brothers	DS	2004.0	Misc	Nintendo	0.0	0.0	0.19
7824	7826	Tokimeki Memorial Girl's Side 3rd Story	DS	2010.0	Adventure	Konami Digital Entertainment	0.0	0.0	0.19
7929	7931	Thoroughbred Breeder	SNES	1993.0	Simulation	Hect	0.0	0.0	0.19
7823	7825	Jikkyou Powerful Pro Yakyuu '96 Kaimakuban	SNES	1996.0	Sports	Konami Digital Entertainment	0.0	0.0	0.19
7914	7916	3rd Super Robot Wars Z Jigoku Hen	PSV	2014.0	Role-Playing	Namco Bandai Games	0.0	0.0	0.19
7932	7934	Nobunaga no Yabou: Souzou	PS3	2013.0	Strategy	Tecmo Koei	0.0	0.0	0.19
7936	7938	Chibi-Robo! Park Patrol	DS	2007.0	Adventure	Unknown	0.0	0.0	0.19

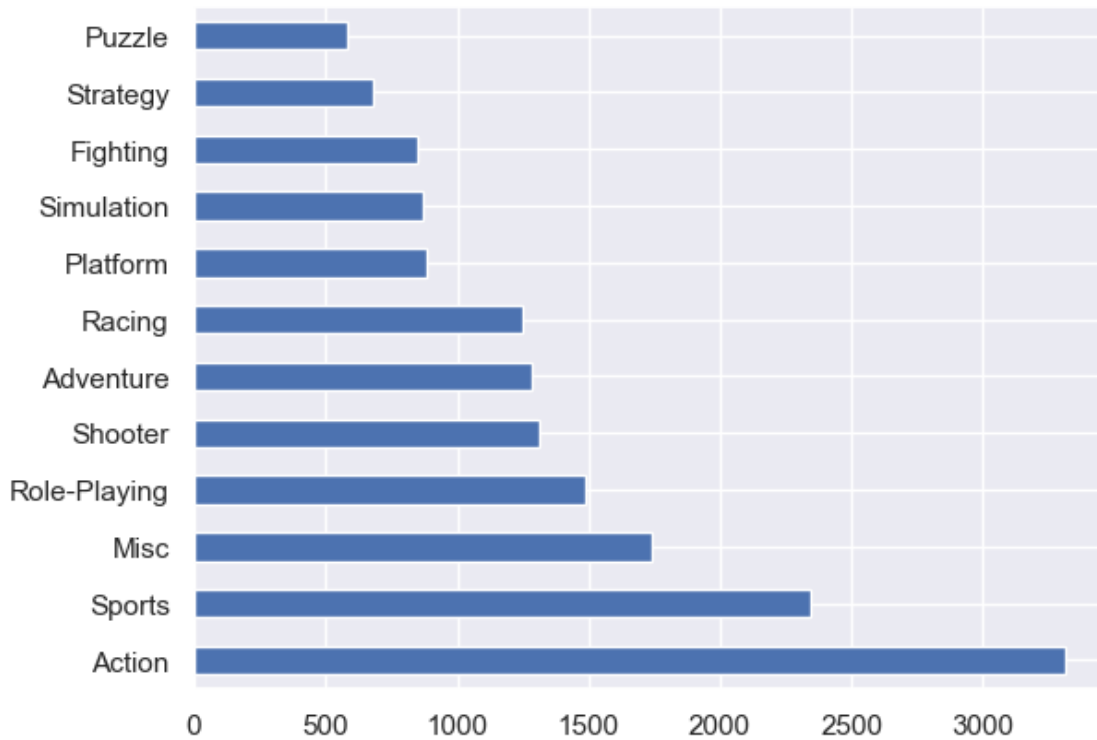
In [40]:

```
data['Publisher'].value_counts().head(15).plot(kind='pie', autopct='%1.1f%%')
plt.savefig("circle.png")
```



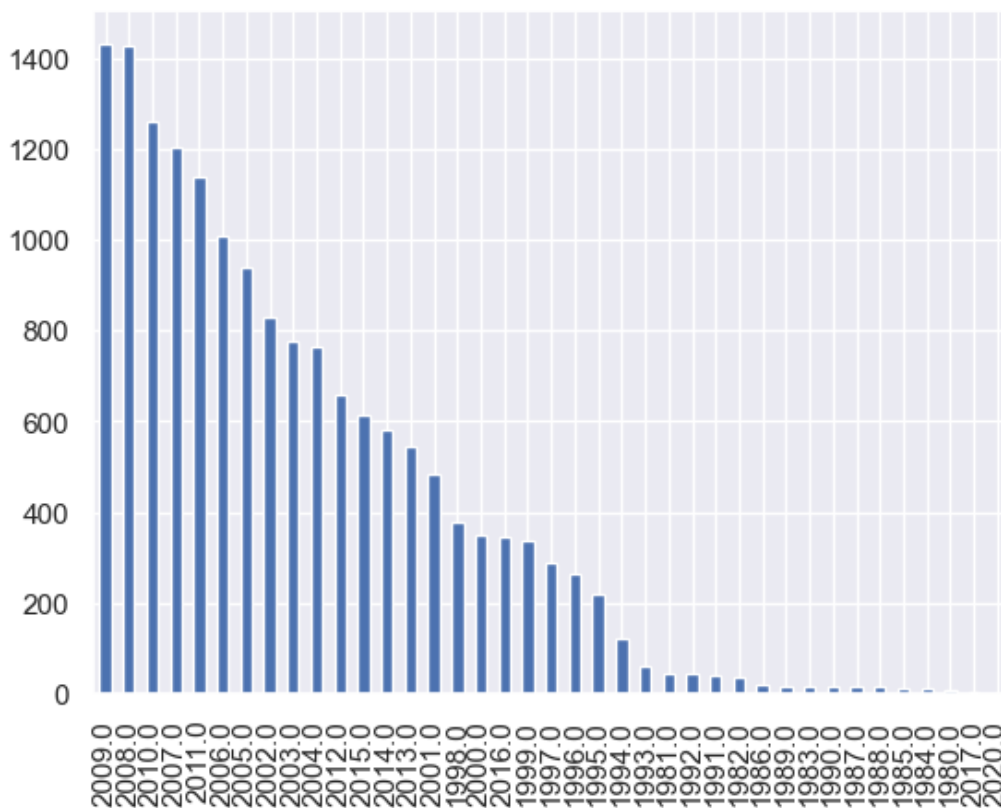
In [31]:

```
data['Genre'].value_counts().head(50).plot(kind='barh')
plt.savefig("barsHorizantel.png")
```



In [33]:

```
data['Year'].value_counts().head(50).plot(kind='bar', stacked=True)
plt.savefig("VeritcalBars.png")
```



In [44]:

```
Groupe = data.groupby(['NA_Sales', 'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global_Sales'],
as_index=False).mean()
```

C:\Users\main_user_khaled\AppData\Local\Temp\ipykernel_19892\3578637671.py:1: FutureWarning: The default value of numeric_only in DataFrameGroupBy.mean is deprecated. In a future version, numeric_only will default to False. Either specify numeric_only or select only c


```
columns which should be valid for the function.  
Groupe = data.groupby(['NA_Sales', 'EU_Sales', 'JP_Sales', 'Other_Sales', 'Global_Sales'],  
as_index=False).mean()
```

In [53]:

```
Groupe
```

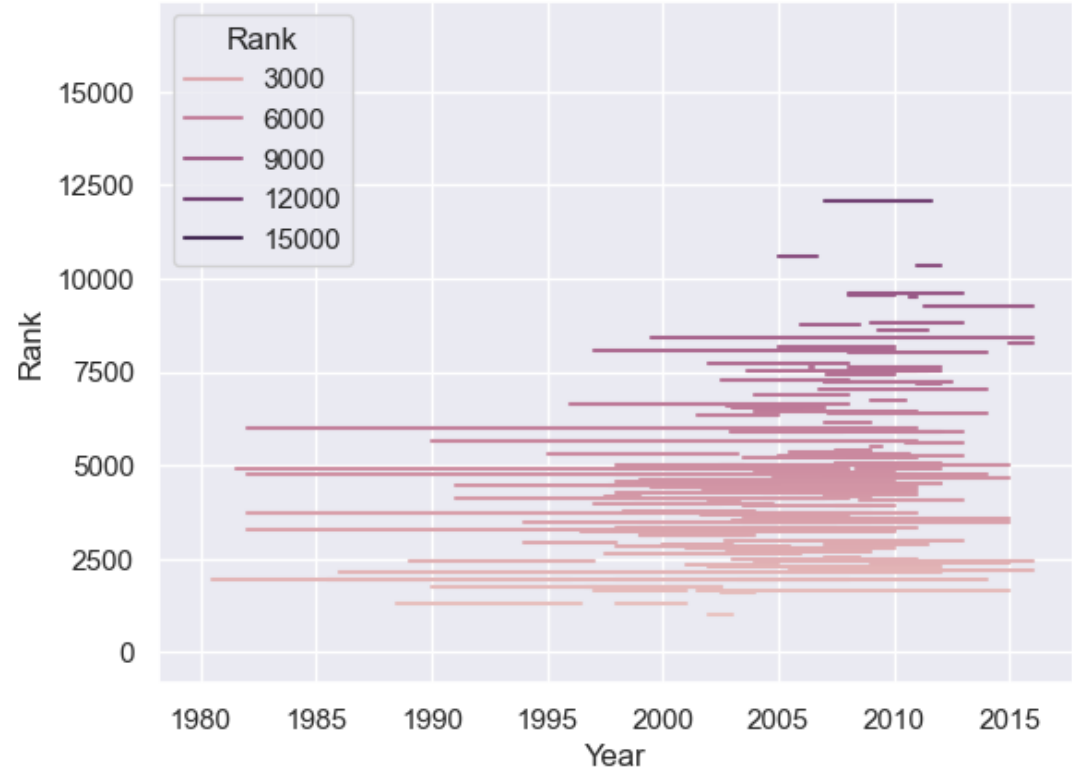
Out[53]:

	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales	Rank	Year
0	0.00	0.00	0.00	0.00	0.01	16598.000000	2008.000000
1	0.00	0.00	0.00	0.18	0.18	8057.000000	2008.000000
2	0.00	0.00	0.01	0.00	0.01	16282.616613	2010.176849
3	0.00	0.00	0.02	0.00	0.02	15464.473461	2009.704104
4	0.00	0.00	0.02	0.00	0.03	14864.000000	1998.666667
...
6769	15.85	12.88	3.79	3.31	35.82	3.000000	2008.000000
6770	23.20	2.26	4.22	0.58	30.26	6.000000	1989.000000
6771	26.93	0.63	0.28	0.47	28.31	10.000000	1984.000000
6772	29.08	3.58	6.81	0.77	40.24	2.000000	1985.000000
6773	41.49	29.02	3.77	8.46	82.74	1.000000	2006.000000

6774 rows x 7 columns

In [52]:

```
sns.lineplot(data = Groupe ,x = 'Year', y='Rank', hue='Rank');  
plt.savefig("multiline.png");
```



In [54]:

```
from IPython.display import Image
```

In []:

```
image_path = ''
```

```
# Display the image
Image(filename=image_path)
```