

Understand the Data

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import missingno as msno
import squarify
import plotly.express as px
import plotly.graph_objects as go
import warnings
warnings.filterwarnings('ignore')
```

```
source = r'C:\Users\Rudra\Downloads\Python_Pandas_profiling\Marvel vs DC\Marvel Vs DC NEW.csv '
```

```
df = pd.read_csv(source, encoding= 'unicode_escape')
```

```
df.sample(7)
```

	ID	Movie	Year \
824	824	Justice League	(2001â(2004)
627	627	Batman Beyond	(1999â(2001)
1473	1473	Young Justice	(2010â()
1147	1147	Human Target	(2010â(2011)
1103	1103	20 to 1	(2005â(2017)
122	122	Mutant X	(2001â(2004)
770	770	The New Batman Adventures	(1997â(1999)

	Genre	RunTime \
824	Animation,Action,Adventure	24 min
627	Animation,Action,Adventure	22 min
1473	Animation,Action,Adventure	23 min
1147	Action,Adventure,Crime	60 min
1103	Documentary	0
122	Action,Adventure,Drama	43 min
770	Animation,Action,Adventure	22 min

	Description	IMDB_Score
824	Diana makes friends with a flighty princess on...	7.4
627	Determined to bring his father's murderers to ...	8.4
1473	Dick Grayson, Artemis Crock, Conner Kent and J...	8.7
1147	A English anthropologist accidentally discover...	8.0
1103	Bert Newton counts down the most glamorous and...	0.0
122	The team tries to stop Eckhart from acquiring ...	6.5
770	Catwoman is pursued by a fanatical cat themed ...	7.0

```
df.size
```

```
11830
```

```
df.shape
```

```
(1690, 7)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 1690 entries, 0 to 1689
```

```
Data columns (total 7 columns):
```

#	Column	Non-Null Count	Dtype
0	ID	1690 non-null	int64
1	Movie	1690 non-null	object
2	Year	1657 non-null	object
3	Genre	1683 non-null	object
4	RunTime	1690 non-null	object
5	Description	1690 non-null	object
6	IMDB_Score	1690 non-null	float64

```
dtypes: float64(1), int64(1), object(5)
```

```
memory usage: 92.6+ KB
```

```
df.describe(include='all')
```

	ID	Movie	Year
Genre \			
count	1690.000000	1690	1657
1683			
unique	NaN	314	147
90			
top	NaN	Smallville	(2001â(2011)
Animation,Action,Adventure			
freq	NaN	176	176
439			
mean	844.500000	NaN	NaN
NaN			
std	488.005294	NaN	NaN
NaN			
min	0.000000	NaN	NaN
NaN			
25%	422.250000	NaN	NaN
NaN			
50%	844.500000	NaN	NaN
NaN			
75%	1266.750000	NaN	NaN
NaN			
max	1689.000000	NaN	NaN
NaN			

	RunTime	Description	IMDB_Score
count	1690	1690	1690.000000

```

unique    126      1571      NaN
top        0      a Plot      NaN
freq      283      117      NaN
mean      NaN      NaN      6.877337
std        NaN      NaN      2.690564
min        NaN      NaN      0.000000
25%        NaN      NaN      6.900000
50%        NaN      NaN      7.800000
75%        NaN      NaN      8.400000
max        NaN      NaN      9.600000

```

```
df.columns
```

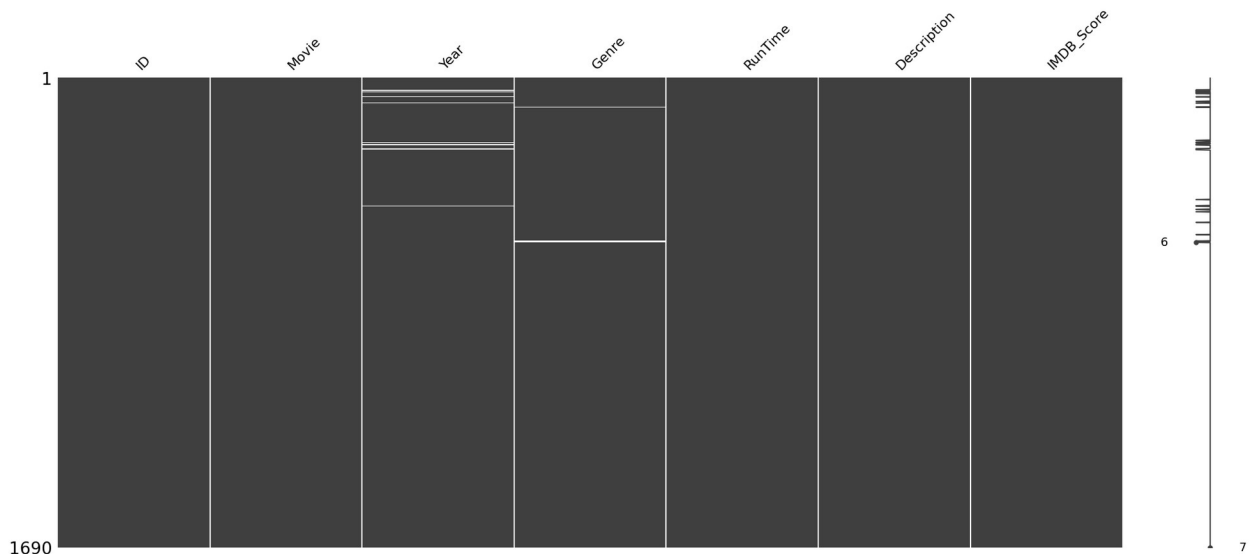
```
Index(['ID', 'Movie', 'Year', 'Genre', 'RunTime', 'Description', 'IMDB_Score'], dtype='object')
```

Data Cleaning

- Create Two separate column for the StartYear, End Year from year column
- Find the Run Time in min

```
msno.matrix(df)
```

```
<Axes: >
```



```
df.iloc[866]
```

```

ID      866
Movie    Justice League Unlimited
Year    (2004â(2006)
Genre    Animation,Action,Adventure

```

```
RunTime 23 min
Description When Circe changes Wonder Woman into a pig, Ba...
IMDB_Score 7.8
Name: 866, dtype: object
```

```
type('RunTime')
```

```
str
```

```
df['RunTime'].sample(7)
```

```
392    122 min
956     43 min
108     43 min
1180      0
329     43 min
772     21 min
1617    51 min
```

```
Name: RunTime, dtype: object
```

```
df['RunTime(Min)'] = df['RunTime'].str.split(expand=True)[0]
df['RunTime(Min)'].sample(9)
```

```
430    45
856    22
818    24
1027   22
1284   42
827    22
441    82
1031   42
898    41
```

```
Name: RunTime(Min), dtype: object
```

```
df['Year'].sample(17)
```

```
339    (2013â(2020)
998    (2001â(2003)
901    (2001â(2011)
1292   (2014â(2019)
1392    (2016â( )
1455    (1992â( )
845    (2001â(2004)
943    (2001â(2011)
163    (2001â(2004)
288    (2013â(2020)
272    (2016â(2018)
1158   (2001â(2011)
31      -2013
239      NaN
1595   (2014â(2019)
```

```

1252         (2010â( )
984         (2001â(2003)
Name: Year, dtype: object

# Extract starting and ending years using regex
df[['StartYear', 'EndYear']] = df['Year'].str.extract(r'(\d{4})[^\d]*(\d{4}| )')

# Clean up EndYear to handle cases with ' ' (no ending year)
df['EndYear'] = df['EndYear'].replace(' ', 'No End Year')

# Display the updated DataFrame
print(df[['Year', 'StartYear', 'EndYear']])

```

	Year	StartYear	EndYear
0	-2021	NaN	NaN
1	(2021â()	2021	No End Year
2	-2021	NaN	NaN
3	-2021	NaN	NaN
4	-2021	NaN	NaN
...
1685	(2016â()	2016	No End Year
1686	(2015â(2021)	2015	2021
1687	(2015â(2021)	2015	2021
1688	(2015â(2021)	2015	2021
1689	(2015â(2021)	2015	2021

```

[1690 rows x 3 columns]

df[['Year', 'StartYear', 'EndYear']].sample(8)

```

	Year	StartYear	EndYear
1592	(2015â(2018)	2015	2018
1381	(2014â(2019)	2014	2019
1443	(2015â(2021)	2015	2021
197	(2021â()	2021	No End Year
1489	(2010â()	2010	No End Year
1636	-2019	NaN	NaN
286	(2013â(2020)	2013	2020
1316	(2014â(2019)	2014	2019

```

df.columns

Index(['ID', 'Movie', 'Year', 'Genre', 'RunTime', 'Description',
      'IMDB_Score',
      'RunTime(Min)', 'StartYear', 'EndYear'],
      dtype='object')

df.drop(columns={"Year", "RunTime", "Description"}, inplace=True)

df.duplicated().sum()

```

0

```
df.isnull().sum()
```

```
ID          0
Movie        0
Genre        7
IMDB_Score   0
RunTime(Min) 0
StartYear    180
EndYear      180
dtype: int64
```

Analysis

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1690 entries, 0 to 1689
Data columns (total 7 columns):
 #   Column                Non-Null Count  Dtype
---  -
 0   ID                    1690 non-null   int64
 1   Movie                 1690 non-null   object
 2   Genre                 1683 non-null   object
 3   IMDB_Score            1690 non-null   float64
 4   RunTime(Min)          1690 non-null   object
 5   StartYear             1510 non-null   object
 6   EndYear               1510 non-null   object
dtypes: float64(1), int64(1), object(5)
memory usage: 92.6+ KB
```

```
df['Genre'].sample(8)
```

```
1278    Crime,Drama,Fantasy
112     Action,Adventure,Drama
176     Animation,Action,Drama
200     Action,Adventure,Comedy
201     Action,Adventure,Drama
1521    Comedy,Talk-Show
1437    Animation,Short,Action
1441    Comedy,Fantasy,Sci-Fi
Name: Genre, dtype: object
```

```
df['Movie'].unique()
```

```
array(['Eternals', 'Loki', 'The Falcon and the Winter Soldier',
       'WandaVision', 'Spider-Man: No Way Home', 'Black Widow',
       'Avengers: Endgame', 'Guardians of the Galaxy',
```

'Thor: Love and Thunder', 'Spider-Man: Far from Home',
 'Thor: Ragnarok', 'Avengers: Infinity War', 'Black Panther',
 'Captain Marvel', 'Shang-Chi and the Legend of the Ten Rings',
 'Spider-Man: Homecoming', 'Avengers: Age of Ultron',
 'Captain America: The First Avenger',
 'Guardians of the Galaxy Vol. 2', 'Thor', 'Iron Man',
 'Captain America: Civil War', 'The Avengers',
 'Doctor Strange in the Multiverse of Madness', 'Brightburn',
 'Doctor Strange', 'Ant-Man', 'Captain America: The Winter
 Soldier',
 'Iron Man 3', 'What If...?', 'Black Panther: Wakanda Forever',
 'Thor: The Dark World', 'Iron Man 2', 'Spider-Man 3',
 'Ant-Man and the Wasp', 'The Incredible Hulk', 'Hawkeye',
 'Guardians of the Galaxy Vol. 3', 'The Marvels', 'Moon Knight',
 'Long Shot', 'Ralph Breaks the Internet',
 'Fantastic 4: Rise of the Silver Surfer', 'Ms. Marvel',
 'Fantastic Four', 'She-Hulk', 'Secret Invasion', 'Deadpool 3',
 'Blade', 'Guardians of the Galaxy: Inferno', 'Ironheart',
 'Armor Wars', 'Punisher: War Zone',
 'Ant-Man and the Wasp: Quantumania', 'I Am Groot',
 'Marvel Studios: Legends', 'Mutant X', 'Captain America 4',
 'Marvel Studios: Assembled',
 'The Guardians of the Galaxy Holiday Special', 'X-Men',
 'Iron Man: Armored Adventures', 'Marvel One-Shot: Agent
 Carter',
 'Team Thor', 'The Oscars', 'Hulk Vs.', 'Wolverine',
 'Avengers: Damage Control', 'The Sinister Six',
 'Ultimate Avengers: The Movie', 'Marvel One-Shot: Item 47',
 'Marvel One-Shot: The Consultant', 'The Invincible Iron Man',
 'Thor: Tales of Asgard', 'Echo',
 'Iron Man and Captain America: Heroes United',
 'Untitled Wakanda Project', 'Iron Man & Hulk: Heroes United',
 'Lego Marvel Avengers: Climate Conundrum',
 'Marvel Studios: Expanding the Universe',
 'Marvel Studios: Assembling a Universe',
 'Stuntwomen: The Untold Hollywood Story',
 'Untitled Marvel Cinematic Universe Television Show',
 'Spider-Man Venom Saga',
 'Spider-Man: The Ultimate Villain Showdown',
 '2016 MTV Movie Awards', 'Avengers S.T.A.T.I.O.N.',
 'Marvel 75 Years: From Pulp to Pop!',
 'Untitled Disney Marvel Film', 'Spider-Man: Maximum Venom',
 'Prodigal', 'The Infinite Six', 'Iron Man 3: The Prologue',
 'Captain America: Civil War Save a Hero Campaign',
 'Jack Kirby: Story Teller',
 '19th Annual Critics' Choice Movie Awards', 'X-Men: Evolution',
 'WWE 24', 'The Talk', 'The Drew Barrymore Show', 'Jessica
 Jones',
 'Luke Cage', 'Agents of S.H.I.E.L.D.', 'The Punisher',

'Entertainment Tonight Canada', 'Wonder Woman 1984',
 'The Suicide Squad', 'The Batman', 'Joker', 'Arrow',
 'The Dark Knight', 'Watchmen', 'Gotham', 'Smallville',
 'Suicide Squad', 'The Dark Knight Rises', 'Doom Patrol',
 'Aquaman',
 'The Sandman', 'Man of Steel', 'Shazam!',
 'Batman v Superman: Dawn of Justice', 'Catch Me If You Can',
 'Batman Begins', 'V for Vendetta', 'Batman', 'I Am Legend',
 'Batman: The Animated Series', 'The Flash', 'Batman & Robin',
 'Constantine', 'Batman Forever', 'Superman',
 'Justice Society: World War II', 'Young Justice', 'Green
 Lantern',
 'Batman: The Long Halloween, Part One', 'Batman Returns',
 'The Karate Kid', 'Supergirl', 'The Iron Giant',
 'Superman Returns', 'Teen Titans', 'Clerks', 'Krypton',
 'Daddy Day Care', 'Superman III', 'Justice League Unlimited',
 'Superman II', 'Justice League', 'Catwoman',
 'Justice League Part Two', 'Batman Beyond',
 'Adventures of Superman', "Trick 'r Treat",
 'Batman: Soul of the Dragon',
 'Justice League: The Flashpoint Paradox', 'Agent Cody Banks',
 'The New Batman Adventures', 'Superman: The Animated Series',
 'Looney Tunes: Back in Action', 'Swamp Thing', 'Batman Ninja',
 'Batman: Gotham Knight', 'Batman: Bad Blood', 'Fred Claus',
 'Batman: Arkham Asylum', 'Justice League: War', 'Wonder Woman',
 'Justice League vs. Teen Titans', 'Constantine: City of
 Demons',
 'Batman Beyond: Return of the Joker', 'Green Lantern Corps',
 'Gotham City Sirens', 'Deadshot', 'Batman vs. Robin',
 'Superman: Doomsday', 'Justice League: Throne of Atlantis',
 'Superman/Batman: Public Enemies', 'Tales of the Black
 Freighter',
 'DC Showcase: Kamandi: The Last Boy on Earth!',
 'Batman & Mr. Freeze: SubZero', 'Being Flynn',
 'Krypto the Superdog', 'Deathstroke',
 'Untitled Joker/Harley Quinn Project', 'The Batman vs.
 Dracula',
 'Blankman', 'Batman: The Telltale Series', 'DC Super Hero
 Girls',
 'Green Lantern: First Flight', 'Teen Titans: Trouble in Tokyo',
 'Batman Beyond: The Movie', 'Zatanna', 'Freedom Fighters: The
 Ray',
 'Lego Batman: The Movie - DC Super Heroes Unite',
 'Mortal Kombat vs. DC Universe', 'The Zeta Project',
 'JLA Adventures: Trapped in Time', 'Gotham Girls',
 'Lego Batman: The Videogame', 'Under the Hood', 'Lobo',
 'Too Funny to Fail: The Life & Death of The Dana Carvey Show',
 'Justice League: Gods and Monsters Chronicles',
 'The Super Powers Team: Galactic Guardians', 'Batman:

Knightfall',
 'LEGO DC Comics Super Heroes: Aquaman - Rage of Atlantis',
 'Challenge of the Superfriends',
 'The Plastic Man Comedy/Adventure Show',
 'Smallville Season 3 Promo',
 'SuperFriends: The Legendary Super Powers Show',
 'The All-New Super Friends Hour',
 'Robotech: The Shadow Chronicles', 'DC Fandome', 'Green Arrow',
 'The Fire Rises: The Creation and Impact of the Dark Knight
 Trilogy',
 'The Omen Legacy', "The World's Greatest SuperFriends",
 'Necessary Evil: Super-Villains of DC Comics', 'Dark Justice',
 'Frankenpimp', 'Superman 50th Anniversary', 'Winx Club',
 'Metropolis', 'You Will Believe: The Cinematic Saga of
 Superman',
 'Greatest Ever 80s Movies', '100 Bullets',
 'The Science of Superman', 'Aquaman: Battle for Atlantis',
 'The Devil You Know: Inside the Mind of Todd McFarlane',
 'First Flight: The Fleischer Superman Series',
 "DC Nation's Farm League", 'Supergirl: The Making of the
 Movie',
 "The Making of 'Superman III'", 'Project 13',
 'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
 Dark Side of the Knight',
 "Taking Flight: The Development of 'Superman'",
 'Legends of the Dark Knight: The History of Batman',
 "Making 'Superman': Filming the Legend",
 'Batman Begins: Path to Discovery', 'Batman: The Journey
 Begins',
 'The Mythology of Superman', 'Batman Returns Villains:
 Catwoman',
 'Batman Heroes: Harvey Dent',
 'The Worst Batman Fanfilm Ever... Period', 'Galaxian',
 'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
 The Legend Reborn',
 'Batman Villains: Bob the Goon',
 'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
 The Gathering Storm',
 'Shaping Mind and Body', "The Making of 'Superman: The Movie'",
 'Saving Gotham City',
 'From Rivals to Romance: The Making of Lois and Clark',
 'Genesis of the Bat', 'The Magic Behind the Cape',
 'Smallville: Justice and Doom', 'Frank Skinner on Muhammad
 Ali',
 'Batman: The Tumbler', 'Batman Returns Villains: The Penguin',
 'Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of
 Batman Returns',
 'Beyond Batman: Sleek, Sexy and Sinister - The Costumes of
 Batman Returns',

```

        'Cape and Cowl', 'Wonder Woman: The Ultimate Feminist Icon',
        'The Complete Robin Storyboard Sequence',
        'Justice League: Alien Invasion', 'Gotham City Rises',
        'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
The Road to Gotham City',
        'Beyond Batman: Inside the Elfman Studio - The Music of Batman
Returns',
        'Batman Returns Heroes: Alfred',
        'DC Fandome - CNN Heroes: Real Life Heroes in the Age of
Coronavirus',
        'Batman Returns Villains: Max Shreck', 'Body and Soul',
        'Beyond Batman: Making Up the Penguin',
        'The Making of 'Superman II'', 'Batman Returns Heroes: Batman',
        'Film Club', 'Beyond Batman: Assembling the Arctic Army',
        'Revolutionizing a Classic: From Comic Book to Television - The
Evolution of Wonder Woman from Page to Screen',
        'Batman Heroes: Vicki Vale', 'Batman: Night's End',
        'Guarding the Balance: Batman and the JLA',
        'Beyond Batman: Gotham City Revisited - The Production Design
of Batman Returns',
        'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
Batman Unbound',
        'Shadows of the Bat: The Cinematic Saga of the Dark Knight -
Reinventing a Hero',
        'The Death and Return of Superman',
        'Batman Heroes: Alexander Knox',
        'Batman Heroes: Commissioner Gordon',
        'Wonder Woman: A Subversive Dream', 'The Super Human In Us
All',
        'Superman II: Restoring the Vision',
        'A Sneek Peak at Justice League: Doom',
        'Superboy: Spies from Outer Space',
        'Aquaman: War of the Water Worlds',
        'Superman: The Mysterious Mr. Mist', 'Batman: Partners in
Peril',
        'Playstation Underground Volume 4', 'Duck Dodgers', 'Cine
Chalom',
        'Family Guy', '20 to 1', 'Batman: Black and White', 'Heroes',
        'Human Target', 'Baggage Battles', 'Beware the Batman',
        'Storage Wars', 'Legends of the Superheroes', 'Lucifer',
        'Powerless', 'Sci-Fi Buzz', 'Gruen XL', 'DC's Legends of
Tomorrow',
        'Black Lightning'], dtype=object)

```

Find out the keywords and categories

```

marvel_most_frequent_keywords = [
    "Iron Man", "Tony Stark", "Captain America", "Steve Rogers",
    "Thor", "Hulk",

```

```
    "Bruce Banner", "Spider-Man", "Peter Parker", "Black Widow",  
    "Natasha Romanoff",  
    "Doctor Strange", "Stephen Strange", "Black Panther", "T'Challa",  
    "Ant-Man",  
    "Scott Lang", "Captain Marvel", "Carol Danvers", "Hawkeye", "Clint  
Barton",  
    "Scarlet Witch", "Wanda Maximoff", "Vision", "Loki", "Thanos",  
    "Nick Fury",  
    "Star-Lord", "Peter Quill", "Gamora", "Rocket Raccoon", "Groot",  
    "Deadpool",  
    "Wolverine", "Logan", "Silver Surfer", "Daredevil", "Matt  
Murdock", "Winter Soldier",  
    "Bucky Barnes", "Avengers", "Hero", "Villain", "Superpower",  
    "Infinity", "Asgard",  
    "Shield", "Superhero", "Power", "Universe", "Battle", "Origin",  
    "War", "Quantum",  
    "Multiverse", "Technology", "Transformation", "Alliance",  
    "Legacy", "Time",  
    "Space", "Justice", "Wakanda", "Stark", "Mutant", "S.H.I.E.L.D.",  
    "Gem", "Crossover",  
    "Team", "God", "Cosmic", "Destiny", "Drax", "Jessica Jones", "Luke  
Cage",  
    "X-Men", "Fantastic Four", "Venom", "Ghost Rider", "The Punisher",  
    "The Eternals",  
    "Blade", "Hank Pym", "Magneto"  
]
```

```
dc_most_frequent_keywords = [  
    "Batman", "Superman", "Justice", "League", "Dark", "Knight",  
    "Wonder Woman",  
    "Suicide Squad", "Man of Steel", "Gotham", "Green Lantern",  
    "Flash", "Arrow",  
    "Titans", "Shazam", "Aquaman", "Joker", "Birds of Prey",  
    "Vengeance", "Crisis",  
    "Return", "Rise", "Legends", "Hero", "Dawn", "Tomorrow", "Gods",  
    "Power",  
    "World", "Origin", "Reign", "Son", "War", "Throne", "Watchmen",  
    "Phantom",  
    "Enemy", "Universe", "Blood", "Redemption", "Doomsday",  
    "Apocalypse", "End",  
    "Constantine", "Catwoman", "Jonah Hex", "Nightwing", "Robin",  
    "Supergirl",  
    "Zatanna", "Swamp Thing", "Blue Beetle", "Black Adam", "Vixen",  
    "Harley Quinn",  
    "Static Shock", "Hawkman", "Green Arrow", "Batgirl", "Superboy",  
    "Darkseid",  
    "Deathstroke", "Lobo", "Spectre", "The Question", "Red Hood",  
    "Lucifer",  
    "Steel", "Raven", "Huntress", "Booster Gold", "Mr. Terrific",  
    "Black Canary",  
]
```

```

    "The Atom", "Martian Manhunter", "Dr. Fate", "Black Lightning",
    "Firestorm",
    "Etrigan", "The Demon", "Orion", "Metamorpho", "Azrael",
    "Deadshot",
    "Solomon Grundy", "Doctor Manhattan"
]

```

```

def dc_or_Marvel (title):
    for keyword in marvel_most_frequent_keywords:
        if keyword in title:
            return 'Marvel'
    for keyword in dc_most_frequent_keywords:
        if keyword in title:
            return 'DC'
    return 'Unknown'
df['dc/marvel'] =df['Movie'].apply(dc_or_Marvel)
df.sample(7)

```

	ID	Movie	Genre
IMDB_Score \			
1534	1534	DC Super Hero Girls	Animation,Short,Action
0.0			
1400	1400	Lucifer	Crime,Drama,Fantasy
9.1			
857	857	Justice League Unlimited	Animation,Action,Adventure
8.6			
617	617	Batman Beyond	Animation,Action,Adventure
6.5			
285	285	Agents of S.H.I.E.L.D.	Action,Adventure,Drama
8.1			
872	872	Justice League	Animation,Action,Adventure
7.3			
1478	1478	Young Justice	Animation,Action,Adventure
9.1			

	RunTime(Min)	StartYear	EndYear	dc/marvel
1534	0	2015	2018	Marvel
1400	43	2016	No End Year	DC
857	24	2004	2006	Marvel
617	22	1999	2001	DC
285	43	2013	2020	Marvel
872	22	2001	2004	Marvel
1478	24	2010	No End Year	Marvel

```
df['dc/marvel'].sample(7)
```

593	Unknown
1350	DC
702	DC
1512	DC

```

1033      DC
998      Unknown
1414      Marvel
Name: dc/marvel, dtype: object

```

Filter the Dataset based on score and unknown values

```

df = df[(df['IMDB_Score'] != 0) & (df['dc/marvel'] != 'Unknown')]
df.sample(7)

```

	ID	Movie	Genre
1407	1407	DC Super Hero Girls	Animation,Short,Action
1011	1011	The Batman	Animation,Action,Adventure
775	775	The New Batman Adventures	Animation,Action,Adventure
86	86	Iron Man & Hulk: Heroes United	Animation,Action,Adventure
467	467	Batman Begins	Action,Adventure,Crime
1658	1658	Supergirl	Action,Adventure,Drama
1253	1253	Young Justice	Animation,Action,Adventure

	IMDB_Score	RunTime(Min)	StartYear	EndYear	dc/marvel
1407	6.6	0	2015	2018	Marvel
1011	7.4	22	2004	2008	DC
775	8.2	22	1997	1999	DC
86	4.7	71	2013	No End Year	Marvel
467	8.2	0	2005	No End Year	DC
1658	6.9	42	2015	2021	DC
1253	8.5	22	2010	No End Year	Marvel

```

df.shape
(1160, 8)

```

Number of Movies

```

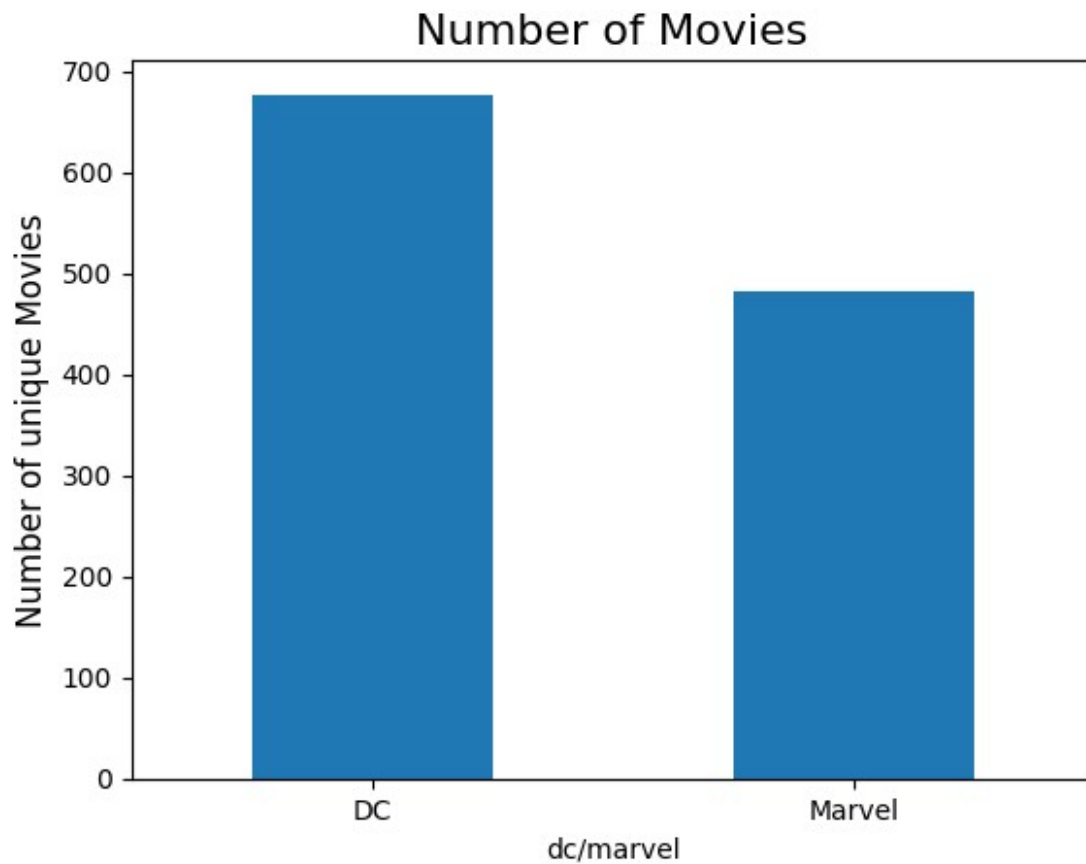
dc_marvel_count = df[df['dc/marvel'].isin(['DC',
'Marvel'])].groupby('dc/marvel')['ID'].count()

dc_marvel_count.plot(
    kind='bar')

plt.title('Number of Movies', fontsize=16)

```

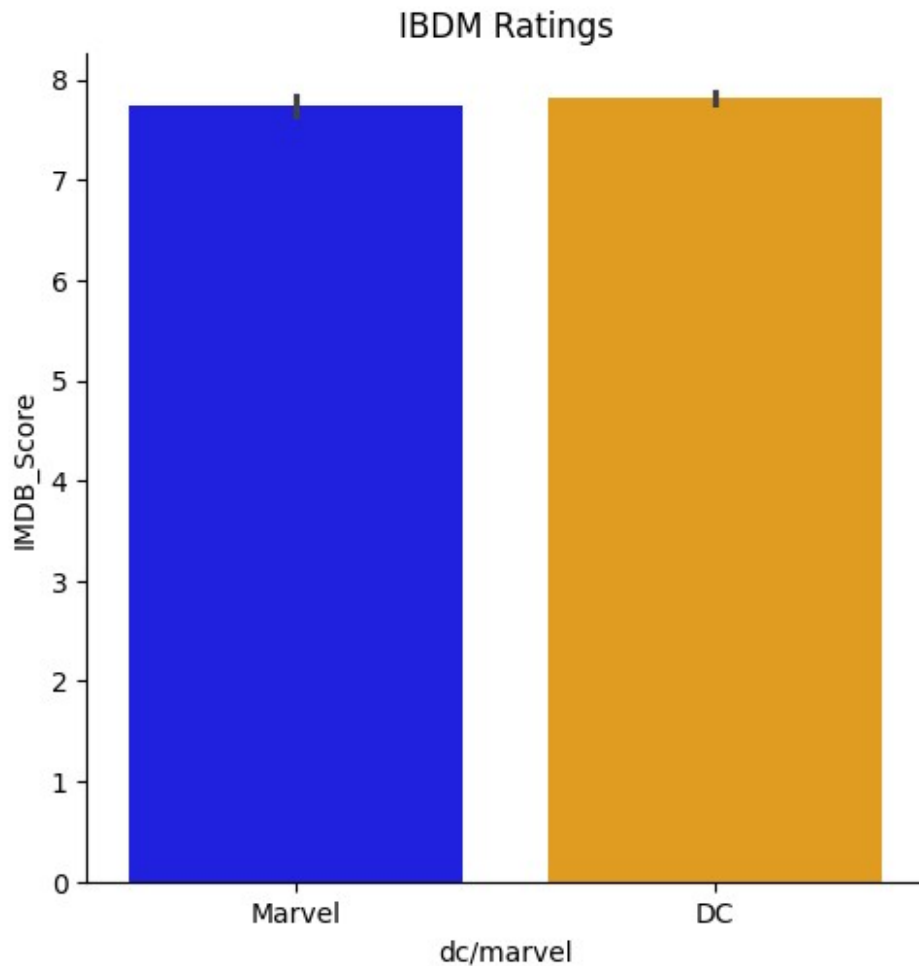
```
plt.ylabel('Number of unique Movies', fontsize=12)
plt.xticks(rotation=0)
plt.show()
```



IBDM Ratings

```
sns.catplot(
    data=df,
    kind='bar',
    x=df['dc/marvel'],
    y=df['IMDB_Score'],
    palette={'DC': 'orange', 'Marvel': 'blue'},
)

plt.title('IBDM Ratings')
plt.show()
```



Number of Movies Produced by DC and Marvel Each Year

```
# Group by year for both DC and Marvel
dc_movie_count = df[df['dc/marvel'] == 'DC'].groupby('StartYear')
['ID'].count().reset_index()
dc_movie_count.columns = ['Year', 'DC_MovieCount']

marvel_movie_count = df[df['dc/marvel'] ==
'Marvel'].groupby('StartYear')['ID'].count().reset_index()
marvel_movie_count.columns = ['Year', 'Marvel_MovieCount']

# Merge the two DataFrames
movie_count_per_year = pd.merge(dc_movie_count, marvel_movie_count,
on='Year', how='outer').fillna(0)
movie_count_per_year
```

	Year	DC_MovieCount	Marvel_MovieCount
0	1952	1.0	0.0
1	1979	1.0	0.0
2	1980	1.0	0.0

3	1982	1.0	0.0
4	1984	1.0	0.0
5	1985	1.0	1.0
6	1987	1.0	0.0
7	1988	1.0	0.0
8	1990	1.0	0.0
9	1991	1.0	0.0
10	1992	86.0	0.0
11	1994	1.0	0.0
12	1996	6.0	1.0
13	1997	25.0	0.0
14	1998	1.0	0.0
15	1999	54.0	0.0
16	2000	33.0	4.0
17	2001	2.0	121.0
18	2002	0.0	1.0
19	2003	12.0	1.0
20	2004	52.0	40.0
21	2005	23.0	11.0
22	2006	6.0	4.0
23	2007	1.0	2.0
24	2008	22.0	3.0
25	2009	5.0	1.0
26	2010	0.0	76.0
27	2011	0.0	3.0
28	2012	14.0	1.0
29	2013	2.0	95.0
30	2014	131.0	5.0
31	2015	87.0	22.0
32	2016	45.0	16.0
33	2017	4.0	13.0
34	2018	6.0	1.0
35	2019	0.0	1.0
36	2020	0.0	1.0
37	2021	7.0	0.0

```
# Plotting stacked bar graph
```

```
plt.figure(figsize=(12, 6))
```

```
# Create a stacked bar plot
```

```
plt.bar(movie_count_per_year['Year'],
movie_count_per_year['DC_MovieCount'],
        color='blue', label='DC')
```

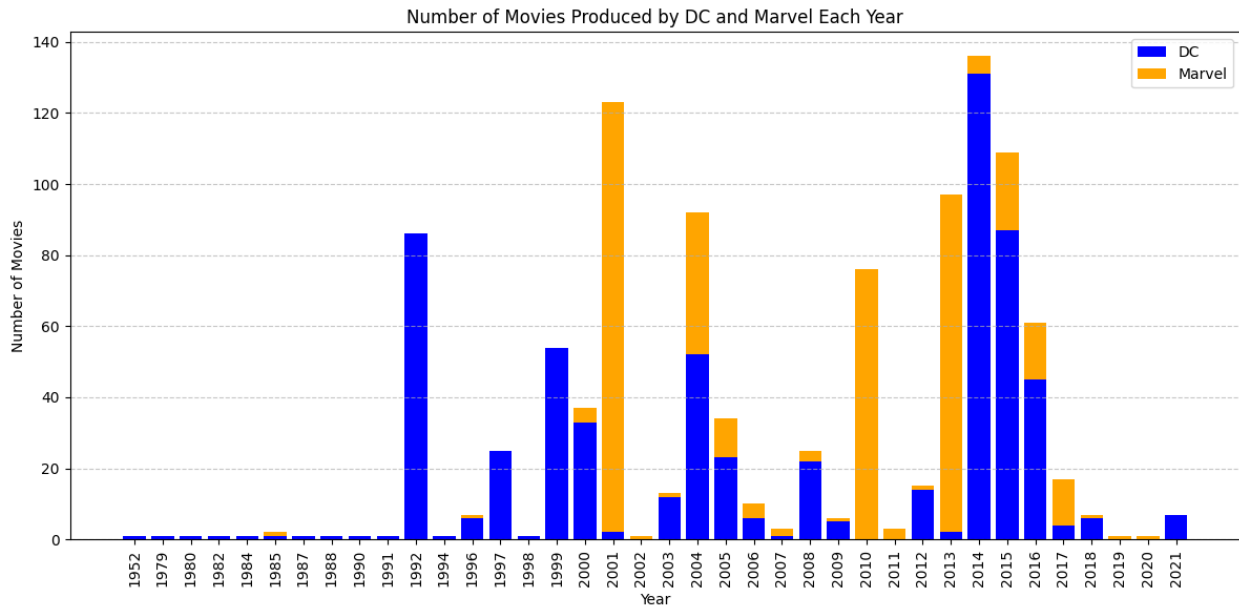
```
plt.bar(movie_count_per_year['Year'],
movie_count_per_year['Marvel_MovieCount'],
        bottom=movie_count_per_year['DC_MovieCount'],
        color='orange', label='Marvel')
```

```
plt.title('Number of Movies Produced by DC and Marvel Each Year')
```

```
plt.xlabel('Year')
```



```
plt.ylabel('Number of Movies')
plt.xticks(rotation=90)
plt.legend()
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.tight_layout()
plt.show()
```



Genre

```
df_unique = df.drop_duplicates(subset='Movie')
df_unique['Genres_List'] = df_unique['Genre'].str.split(',')
df_exploded = df_unique.explode('Genres_List')

df_exploded_clean = df_exploded.dropna(subset=['Genres_List'])

df_exploded_clean =
df_exploded_clean[df_exploded_clean['Genres_List'].str.strip() != '']

fig = px.treemap(
    df_exploded_clean,
    path=['dc/marvel', 'Genres_List', 'Movie'],
    title='Marvel and DC film genres',
    hover_data=['IMDB_Score'],
    color='IMDB_Score',
    color_continuous_scale='ylorbr'
)

fig.show()

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Mr. Freeze: SubZero", "DC/Animation/Batman & Mr. Freeze:
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Penguin", "Marvel/Short/Batman Returns Villains: The

Penguin", "Marvel/Documentary/Batman Villains: Bob the Goon", "Marvel/Short/Batman Villains: Bob the Goon", "Marvel/Action/Batman v Superman: Dawn of Justice", "Marvel/Adventure/Batman v Superman: Dawn of Justice", "Marvel/Sci-Fi/Batman v Superman: Dawn of Justice", "DC/Action/Batman vs. Robin", "DC/Adventure/Batman vs. Robin", "DC/Animation/Batman vs. Robin", "DC/Action/Batman: Arkham Asylum", "DC/Adventure/Batman: Arkham Asylum", "DC/Crime/Batman: Arkham Asylum", "DC/Action/Batman: Bad Blood", "DC/Adventure/Batman: Bad Blood", "DC/Animation/Batman: Bad Blood", "DC/Animation/Batman: Black and White", "DC/Crime/Batman: Black and White", "DC/Drama/Batman: Black and White", "DC/Action/Batman: Gotham Knight", "DC/Animation/Batman: Gotham Knight", "DC/Crime/Batman: Gotham Knight", "DC/Short/Batman: Night's End", "DC/Action/Batman: Soul of the Dragon", "DC/Adventure/Batman: Soul of the Dragon", "DC/Animation/Batman: Soul of the Dragon", "DC/Action/Batman: The Animated Series", "DC/Adventure/Batman: The Animated Series", "DC/Animation/Batman: The Animated Series", "DC/Documentary/Batman: The Journey Begins", "DC/Short/Batman: The Journey Begins", "DC/Action/Batman: The Telltale Series", "DC/Crime/Batman: The Telltale Series", "DC/Sci-Fi/Batman: The Telltale Series", "DC/Documentary/Batman: The Tumbler", "DC/Short/Batman: The Tumbler", "DC/Action/Beware the Batman", "DC/Adventure/Beware the Batman", "DC/Animation/Beware the Batman", "DC/Documentary/Beyond Batman: Assembling the Arctic Army", "DC/Short/Beyond Batman: Assembling the Arctic Army", "DC/Documentary/Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns", "DC/Short/Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns", "DC/Documentary/Beyond Batman: Gotham City Revisited - The Production Design of Batman Returns", "DC/Short/Beyond Batman: Gotham City Revisited - The Production Design of Batman Returns", "DC/Documentary/Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "DC/Music/Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "DC/Short/Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "DC/Documentary/Beyond Batman: Making Up the Penguin", "DC/Short/Beyond Batman: Making Up the Penguin", "DC/Documentary/Beyond Batman: Sleek, Sexy and Sinister - The Costumes of Batman Returns", "DC/Short/Beyond Batman: Sleek, Sexy and Sinister - The Costumes of Batman Returns", "DC/Action/Black Lightning", "DC/Drama/Black Lightning", "DC/Sci-Fi/Black Lightning", "Marvel/Action/Black Panther", "Marvel/Adventure/Black Panther", "Marvel/Sci-Fi/Black Panther", "Marvel/Action/Blade", "Marvel/Animation/Blade", "Marvel/Horror/Blade", "Marvel/Action/Captain America: Civil War", "Marvel/Adventure/Captain America: Civil War", "Marvel/Sci-Fi/Captain America: Civil War", "Marvel/Short/Captain America: Civil War Save a Hero Campaign", "Marvel/Action/Captain America: The First Avenger", "Marvel/Adventure/Captain America: The

First Avenger", "Marvel/Sci-Fi/Captain America: The First Avenger", "Marvel/Action/Captain America: The Winter Soldier", "Marvel/Adventure/Captain America: The Winter Soldier", "Marvel/Sci-Fi/Captain America: The Winter Soldier", "Marvel/Action/Captain Marvel", "Marvel/Adventure/Captain Marvel", "Marvel/Sci-Fi/Captain Marvel", "DC/Action/Catwoman", "DC/Crime/Catwoman", "DC/Fantasy/Catwoman", "DC/Action/Constantine", "DC/Fantasy/Constantine", "DC/Horror/Constantine", "DC/Animation/Constantine: City of Demons", "DC/Fantasy/Constantine: City of Demons", "DC/Short/Constantine: City of Demons", "DC/Animation/DC Nation's Farm League", "DC/Fantasy/DC Nation's Farm League", "DC/Sci-Fi/DC Nation's Farm League", "Marvel/Action/DC Super Hero Girls", "Marvel/Animation/DC Super Hero Girls", "Marvel/Short/DC Super Hero Girls", "DC/Action/DC's Legends of Tomorrow", "DC/Adventure/DC's Legends of Tomorrow", "DC/Drama/DC's Legends of Tomorrow", "Marvel/Action/Dark Justice", "Marvel/Short/Dark Justice", "Marvel/Action/Doctor Strange", "Marvel/Adventure/Doctor Strange", "Marvel/Fantasy/Doctor Strange", "Marvel/Action/Fantastic 4: Rise of the Silver Surfer", "Marvel/Adventure/Fantastic 4: Rise of the Silver Surfer", "Marvel/Fantasy/Fantastic 4: Rise of the Silver Surfer", "DC/Documentary/First Flight: The Fleischer Superman Series", "DC/Short/First Flight: The Fleischer Superman Series", "DC/Action/Gotham", "DC/Crime/Gotham", "DC/Drama/Gotham", "DC/Documentary/Gotham City Rises", "DC/Short/Gotham City Rises", "DC/Animation/Gotham Girls", "DC/Comedy/Gotham Girls", "DC/Crime/Gotham Girls", "DC/Animation/Green Arrow", "DC/Sci-Fi/Green Arrow", "DC/Action/Green Lantern", "DC/Adventure/Green Lantern", "DC/Sci-Fi/Green Lantern", "DC/Action/Green Lantern: First Flight", "DC/Adventure/Green Lantern: First Flight", "DC/Animation/Green Lantern: First Flight", "DC/Short/Guarding the Balance: Batman and the JLA", "Marvel/Drama/Heroes", "Marvel/Fantasy/Heroes", "Marvel/Sci-Fi/Heroes", "Marvel/Action/Hulk Vs.", "Marvel/Adventure/Hulk Vs.", "Marvel/Animation/Hulk Vs.", "Marvel/Action/Iron Man", "Marvel/Adventure/Iron Man", "Marvel/Sci-Fi/Iron Man", "Marvel/Action/Iron Man & Hulk: Heroes United", "Marvel/Adventure/Iron Man & Hulk: Heroes United", "Marvel/Animation/Iron Man & Hulk: Heroes United", "Marvel/Action/Iron Man 2", "Marvel/Adventure/Iron Man 2", "Marvel/Sci-Fi/Iron Man 2", "Marvel/Action/Iron Man 3", "Marvel/Adventure/Iron Man 3", "Marvel/Sci-Fi/Iron Man 3", "Marvel/Action/Iron Man 3: The Prologue", "Marvel/Short/Iron Man 3: The Prologue", "Marvel/Action/Iron Man and Captain America: Heroes United", "Marvel/Adventure/Iron Man and Captain America: Heroes United", "Marvel/Animation/Iron Man and Captain America: Heroes United", "Marvel/Action/Iron Man: Armored Adventures", "Marvel/Adventure/Iron Man: Armored Adventures", "Marvel/Animation/Iron Man: Armored

Adventures", "Marvel/Action/JLA Adventures: Trapped in Time", "Marvel/Animation/JLA Adventures: Trapped in Time", "Marvel/Sci-Fi/JLA Adventures: Trapped in Time", "Marvel/Action/Jessica Jones", "Marvel/Crime/Jessica Jones", "Marvel/Drama/Jessica Jones", "DC/Crime/Joker", "DC/Drama/Joker", "DC/Thriller/Joker", "Marvel/Action/Justice League", "Marvel/Adventure/Justice League", "Marvel/Animation/Justice League", "Marvel/Action/Justice League Unlimited", "Marvel/Adventure/Justice League Unlimited", "Marvel/Animation/Justice League Unlimited", "Marvel/Action/Justice League vs. Teen Titans", "Marvel/Adventure/Justice League vs. Teen Titans", "Marvel/Animation/Justice League vs. Teen Titans", "Marvel/Adventure/Justice League: Alien Invasion", "Marvel/Sci-Fi/Justice League: Alien Invasion", "Marvel/Short/Justice League: Alien Invasion", "Marvel/Action/Justice League: Gods and Monsters Chronicles", "Marvel/Animation/Justice League: Gods and Monsters Chronicles", "Marvel/Short/Justice League: Gods and Monsters Chronicles", "Marvel/Action/Justice League: The Flashpoint Paradox", "Marvel/Adventure/Justice League: The Flashpoint Paradox", "Marvel/Animation/Justice League: The Flashpoint Paradox", "Marvel/Action/Justice League: Throne of Atlantis", "Marvel/Adventure/Justice League: Throne of Atlantis", "Marvel/Animation/Justice League: Throne of Atlantis", "Marvel/Action/Justice League: War", "Marvel/Adventure/Justice League: War", "Marvel/Animation/Justice League: War", "Marvel/Action/Justice Society: World War II", "Marvel/Adventure/Justice Society: World War II", "Marvel/Animation/Justice Society: World War II", "Marvel/Action/LEGO DC Comics Super Heroes: Aquaman - Rage of Atlantis", "Marvel/Adventure/LEGO DC Comics Super Heroes: Aquaman - Rage of Atlantis", "Marvel/Animation/LEGO DC Comics Super Heroes: Aquaman - Rage of Atlantis", "DC/Documentary/Legends of the Dark Knight: The History of Batman", "DC/Short/Legends of the Dark Knight: The History of Batman", "Marvel/Action/Legends of the Superheroes", "Marvel/Adventure/Legends of the Superheroes", "Marvel/Comedy/Legends of the Superheroes", "Marvel/Action/Lego Batman: The Movie - DC Super Heroes Unite", "Marvel/Adventure/Lego Batman: The Movie - DC Super Heroes Unite", "Marvel/Animation/Lego Batman: The Movie - DC Super Heroes Unite", "DC/Action/Lego Batman: The Videogame", "DC/Adventure/Lego Batman: The Videogame", "DC/Fantasy/Lego Batman: The Videogame", "Marvel/Animation/Lego Marvel Avengers: Climate Conundrum", "DC/Action/Lobo", "DC/Animation/Lobo", "DC/Short/Lobo", "DC/Crime/Lucifer", "DC/Drama/Lucifer", "DC/Fantasy/Lucifer", "Marvel/Action/Luke Cage", "Marvel/Crime/Luke Cage", "Marvel/Drama/Luke Cage", "DC/Documentary/Making 'Superman': Filming the Legend", "DC/Short/Making 'Superman': Filming the Legend", "DC/Action/Man of Steel", "DC/Adventure/Man of Steel", "DC/Sci-Fi/Man of Steel", "Marvel/Documentary/Marvel Studios: Assembling a

Universe", "Marvel/History/Marvel Studios: Assembling a Universe", "Marvel/Documentary/Marvel Studios: Expanding the Universe", "Marvel/Short/Marvel Studios: Expanding the Universe", "DC/Action/Marvel Studios: Legends", "DC/Fantasy/Marvel Studios: Legends", "DC/Sci-Fi/Marvel Studios: Legends", "Marvel/Action/Mortal Kombat vs. DC Universe", "Marvel/Adventure/Mortal Kombat vs. DC Universe", "Marvel/Fantasy/Mortal Kombat vs. DC Universe", "Marvel/Action/Mutant X", "Marvel/Adventure/Mutant X", "Marvel/Drama/Mutant X", "Marvel/Documentary/Necessary Evil: Super-Villains of DC Comics", "Marvel/Comedy/Powerless", "Marvel/Fantasy/Powerless", "Marvel/Sci-Fi/Powerless", "Marvel/Action/Punisher: War Zone", "Marvel/Crime/Punisher: War Zone", "Marvel/Drama/Punisher: War Zone", "DC/Documentary/Revolutionizing a Classic: From Comic Book to Television - The Evolution of Wonder Woman from Page to Screen", "DC/Short/Revolutionizing a Classic: From Comic Book to Television - The Evolution of Wonder Woman from Page to Screen", "DC/Documentary/Saving Gotham City", "DC/Short/Saving Gotham City", "DC/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Batman Unbound", "DC/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Batman Unbound", "DC/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Dark Side of the Knight", "DC/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Dark Side of the Knight", "Marvel/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Reinventing a Hero", "Marvel/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - Reinventing a Hero", "DC/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Gathering Storm", "DC/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Gathering Storm", "DC/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Legend Reborn", "DC/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Legend Reborn", "DC/Documentary/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Road to Gotham City", "DC/Short/Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Road to Gotham City", "DC/Action/Shazam!", "DC/Adventure/Shazam!", "DC/Comedy/Shazam!", "Marvel/Animation/Smallville: Justice and Doom", "Marvel/Sci-Fi/Smallville: Justice and Doom", "Marvel/Action/Spider-Man 3", "Marvel/Adventure/Spider-Man 3", "Marvel/Sci-Fi/Spider-Man 3", "Marvel/Animation/Spider-Man Venom Saga", "Marvel/Action/Spider-Man: Far from Home", "Marvel/Adventure/Spider-Man: Far from Home", "Marvel/Sci-Fi/Spider-Man: Far from Home", "Marvel/Action/Spider-Man: Homecoming", "Marvel/Adventure/Spider-Man: Homecoming", "Marvel/Sci-Fi/Spider-Man: Homecoming", "Marvel/Action/Spider-Man: The Ultimate Villain Showdown", "Marvel/Adventure/Spider-Man: The Ultimate Villain Showdown"

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Invincible Iron Man", "DC/Documentary/The Making of 'Superman II'", "DC/Documentary/The Making of 'Superman III'", "DC/Documentary/The Making of 'Superman: The Movie'", "DC/Documentary/The Mythology of Superman", "DC/Short/The Mythology of Superman", "DC/Action/The New Batman Adventures", "DC/Adventure/The New Batman Adventures", "DC/Animation/The New Batman Adventures", "Marvel/Documentary/The Omen Legacy", "Marvel/Action/The Punisher", "Marvel/Crime/The Punisher", "Marvel/Drama/The Punisher", "DC/Documentary/The Science of Superman", "Marvel/Adventure/The Super Powers Team: Galactic Guardians", "Marvel/Animation/The Super Powers Team: Galactic Guardians", "Marvel/Fantasy/The Super Powers Team: Galactic Guardians", "DC/Adventure/The World's Greatest SuperFriends", "DC/Animation/The World's Greatest SuperFriends", "DC/Action/The Worst Batman Fanfilm Ever... Period", "DC/Comedy/The Worst Batman Fanfilm Ever... Period", "DC/Short/The Worst Batman Fanfilm Ever... Period", "Marvel/Action/Thor", "Marvel/Adventure/Thor", "Marvel/Fantasy/Thor", "Marvel/Action/Thor: Ragnarok", "Marvel/Adventure/Thor: Ragnarok", "Marvel/Comedy/Thor: Ragnarok", "Marvel/Action/Thor: Tales of Asgard", "Marvel/Adventure/Thor: Tales of Asgard", "Marvel/Animation/Thor: Tales of Asgard", "Marvel/Action/Thor: The Dark World", "Marvel/Adventure/Thor: The Dark World", "Marvel/Fantasy/Thor: The Dark World", "Marvel/Action/Ultimate Avengers: The Movie", "Marvel/Adventure/Ultimate Avengers: The Movie", "Marvel/Animation/Ultimate Avengers: The Movie", "Marvel/Action/WandaVision", "Marvel/Comedy/WandaVision", "Marvel/Drama/WandaVision", "DC/Action/Watchmen", "DC/Drama/Watchmen", "DC/Mystery/Watchmen", "Marvel/Action/Wolverine", "Marvel/Animation/Wolverine", "Marvel/Sci-Fi/Wolverine", "DC/Action/Wonder Woman", "DC/Adventure/Wonder Woman", "DC/Animation/Wonder Woman", "DC/Action/Wonder Woman 1984", "DC/Adventure/Wonder Woman 1984", "DC/Fantasy/Wonder Woman 1984", "DC/Documentary/Wonder Woman: A Subversive Dream", "DC/Short/Wonder Woman: A Subversive Dream", "DC/Short/Wonder Woman: The Ultimate Feminist Icon", "Marvel/Action/X-Men", "Marvel/Animation/X-Men", "Marvel/Sci-Fi/X-Men", "Marvel/Action/X-Men: Evolution", "Marvel/Animation/X-Men: Evolution", "Marvel/Drama/X-Men: Evolution", "DC/Documentary/You Will Believe: The Cinematic Saga of Superman", "Marvel/Action/Young Justice", "Marvel/Adventure/Young Justice", "Marvel/Animation/Young Justice", "DC/Action", "Marvel/Action", "DC/Adventure", "Marvel/Adventure", "DC/Animation", "Marvel/Animation", "DC/Comedy", "Marvel/Comedy", "DC/Crime", "Marvel/Crime", "DC/Documentary", "Marvel/Documentary", "DC/Drama", "Marvel/Drama", "Marvel/Family", "DC/Fantasy", "Marvel/Fantasy", "Marvel/History", "DC/Horror", "Marvel/Horror", "DC/Music", "DC/Mystery", "Marvel/Reality-TV", "DC/Sci-Fi", "Marvel/Sci-Fi", "DC/Short", "Marvel/Short", "DC/Thriller", "DC", "Marvel"], "labels": ["A Sneek Peak at Justice League: Doom", "A Sneek Peak at Justice League: Doom", "Adventures of Superman", "Adventures of Superman", "Adventures of

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"Ant-Man","Ant-Man","Ant-Man","Ant-Man and the Wasp","Ant-Man and the Wasp",
"Ant-Man and the Wasp","Aquaman","Aquaman","Aquaman","Aquaman: Battle for Atlantis",
"Aquaman: Battle for Atlantis","Aquaman: Battle for Atlantis","Aquaman: War of the Water Worlds",
"Aquaman: War of the Water Worlds","Aquaman: War of the Water Worlds","Arrow",
"Arrow","Arrow","Arrow","Avengers S.T.A.T.I.O.N.",
"Avengers: Age of Ultron",
"Avengers: Age of Ultron","Avengers: Age of Ultron",
"Avengers: Damage Control",
"Avengers: Endgame",
"Avengers: Endgame",
"Avengers: Endgame",
"Avengers: Infinity War",
"Avengers: Infinity War",
"Avengers: Infinity War",
"Baggage Battles",
"Batman",
"Batman",
"Batman & Mr. Freeze: SubZero",
"Batman & Mr. Freeze: SubZero",
"Batman & Mr. Freeze: SubZero",
"Batman & Robin",
"Batman & Robin",
"Batman Begins",
"Batman Begins",
"Batman Begins: Path to Discovery",
"Batman Begins: Path to Discovery",
"Batman Beyond",
"Batman Beyond",
"Batman Beyond",
"Batman Beyond: Return of the Joker",
"Batman Beyond: Return of the Joker",
"Batman Beyond: Return of the Joker",
"Batman Beyond: The Movie",
"Batman Beyond: The Movie",
"Batman Forever",
"Batman Forever",
"Batman Heroes: Alexander Knox",
"Batman Heroes: Alexander Knox",
"Batman Heroes: Commissioner Gordon",
"Batman Heroes: Commissioner Gordon",
"Batman Heroes: Harvey Dent",
"Batman Heroes: Harvey Dent",
"Batman Heroes: Vicki Vale",
"Batman Heroes: Vicki Vale",
"Batman Ninja",
"Batman Ninja",
"Batman Ninja",
"Batman Returns",
"Batman Returns",
"Batman Returns",
"Batman Returns Heroes: Alfred",
"Batman Returns Heroes: Alfred",
"Batman Returns Heroes: Alfred",
"Batman Returns Heroes: Batman",
"Batman Returns Heroes: Batman",
"Batman Returns Villains: Catwoman",
"Batman Returns Villains: Catwoman",
"Batman Returns Villains: Catwoman",
"Batman Returns Villains: Max Shreck",
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"Batman Returns Villains: The Penguin",
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"Batman Returns Villains: The Penguin",
"Batman Villains: Bob the Goon",
"Batman Villains: Bob the Goon",
"Batman Villains: Bob the Goon",
"Batman v Superman: Dawn of Justice",
"Batman v Superman: Dawn of Justice",
"Batman v Superman: Dawn of Justice",
"Batman vs. Robin",
"Batman vs. Robin",
"Batman vs. Robin",
"Batman: Arkham Asylum",
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"Batman: Bad Blood",
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"Batman: Black and White",
"Batman: Black and White",
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"Batman: Gotham Knight",
"Batman: Gotham Knight",
"Batman: Gotham Knight",
"Batman: Night's End",
"Batman: Soul of the Dragon",
"Batman: Soul of the Dragon",
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"Batman: The Animated Series",
"Batman: The Animated Series",
"Batman: The Animated Series",
"Batman: The Journey Begins",
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"Batman: The Telltale Series",
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"Batman: The Tumbler",
"Batman: The Tumbler",
"Beware the Batman",
"Beware the Batman",
"Beware the Batman",
"Beyond Batman: Assembling the Arctic Army",
"Beyond Batman: Assembling the Arctic Army",
"Beyond Batman: Assembling the Arctic Army",
"Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns",
"Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns",
"Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns",
"Beyond Batman: Gotham City

Revisited - The Production Design of Batman Returns", "Beyond Batman: Gotham City Revisited - The Production Design of Batman Returns", "Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "Beyond Batman: Making Up the Penguin", "Beyond Batman: Making Up the Penguin", "Beyond Batman: Sleek, Sexy and Sinister - The Costumes of Batman Returns", "Beyond Batman: Sleek, Sexy and Sinister - The Costumes of Batman Returns", "Black Lightning", "Black Lightning", "Black Lightning", "Black Panther", "Black Panther", "Black Panther", "Blade", "Blade", "Blade", "Captain America: Civil War", "Captain America: Civil War", "Captain America: Civil War", "Captain America: Civil War Save a Hero Campaign", "Captain America: The First Avenger", "Captain America: The First Avenger", "Captain America: The Winter Soldier", "Captain America: The Winter Soldier", "Captain America: The Winter Soldier", "Captain Marvel", "Captain Marvel", "Captain Marvel", "Catwoman", "Catwoman", "Catwoman", "Constantine", "Constantine", "Constantine", "Constantine: City of Demons", "Constantine: City of Demons", "Constantine: City of Demons", "DC Nation's Farm League", "DC Nation's Farm League", "DC Nation's Farm League", "DC Super Hero Girls", "DC Super Hero Girls", "DC Super Hero Girls", "DC's Legends of Tomorrow", "DC's Legends of Tomorrow", "DC's Legends of Tomorrow", "Dark Justice", "Dark Justice", "Doctor Strange", "Doctor Strange", "Doctor Strange", "Fantastic 4: Rise of the Silver Surfer", "Fantastic 4: Rise of the Silver Surfer", "Fantastic 4: Rise of the Silver Surfer", "First Flight: The Fleischer Superman Series", "First Flight: The Fleischer Superman Series", "Gotham", "Gotham", "Gotham", "Gotham City Rises", "Gotham City Rises", "Gotham Girls", "Gotham Girls", "Gotham Girls", "Green Arrow", "Green Arrow", "Green Lantern", "Green Lantern", "Green Lantern", "Green Lantern: First Flight", "Green Lantern: First Flight", "Green Lantern: First Flight", "Guarding the Balance: Batman and the JLA", "Heroes", "Heroes", "Heroes", "Hulk Vs.", "Hulk Vs.", "Hulk Vs.", "Iron Man", "Iron Man", "Iron Man", "Iron Man & Hulk: Heroes United", "Iron Man & Hulk: Heroes United", "Iron Man & Hulk: Heroes United", "Iron Man 2", "Iron Man 2", "Iron Man 2", "Iron Man 3", "Iron Man 3", "Iron Man 3", "Iron Man 3: The Prologue", "Iron Man 3: The Prologue", "Iron Man and Captain America: Heroes United", "Iron Man and Captain America: Heroes United", "Iron Man and Captain America: Heroes United", "Iron Man: Armored Adventures", "Iron Man: Armored Adventures", "Iron Man: Armored Adventures", "JLA Adventures: Trapped in Time", "JLA Adventures: Trapped in Time", "JLA Adventures: Trapped in Time", "Jessica Jones", "Jessica Jones", "Jessica Jones", "Joker", "Joker", "Joker", "Justice League", "Justice League", "Justice League", "Justice League Unlimited", "Justice League Unlimited", "Justice League Unlimited", "Justice League vs. Teen Titans", "Justice League vs. Teen Titans", "Justice League vs. Teen Titans", "Justice League: Alien Invasion", "Justice League: Alien

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Runtime vs. IMDB Score

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# Create a scatter plot for Runtime vs. IMDB Score
fig = px.scatter(
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    y='IMDB_Score',   # IMDB Score
    color='dc/marvel', # Color points by DC or Marvel
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Distribution of IMDb Scores

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df_unique['IMDB_Score'] = pd.to_numeric(df_unique['IMDB_Score'],
errors='coerce')
df_unique['RunTime(Min)'] = pd.to_numeric(df_unique['RunTime(Min)'],
errors='coerce')

# Drop rows with NaN values in 'IMDB_Score' or 'RunTime(Min)'
df_unique_cleaned = df_unique.dropna(subset=['IMDB_Score',
'RunTime(Min)'])

# size
```

```

plt.figure(figsize=(12, 7))
# Create the scatter plot
fig = px.scatter(
    df_unique_cleaned,
    x='StartYear',
    y='IMDB_Score',
    size='RunTime(Min)',
    size_max=40,
    color='dc/marvel',
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)

# Show the plot
fig.show()

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Ultron","Captain America: The First Avenger","Thor","Iron
Man","Captain America: Civil War","The Avengers","Doctor
Strange","Ant-Man","Captain America: The Winter Soldier","Iron Man
3","Thor: The Dark World","Iron Man 2","Spider-Man 3","Ant-Man and the
Wasp","The Incredible Hulk","Fantastic 4: Rise of the Silver
Surfer","Punisher: War Zone","Mutant X","X-Men","Iron Man: Armored
Adventures","Team Thor","Hulk Vs.","Wolverine","Avengers: Damage
Control","Ultimate Avengers: The Movie","The Invincible Iron
Man","Blade","Thor: Tales of Asgard","Iron Man and Captain America:
Heroes United","Iron Man & Hulk: Heroes United","Lego Marvel Avengers:
Climate Conundrum","Marvel Studios: Expanding the Universe","Marvel
Studios: Assembling a Universe","Spider-Man Venom Saga","Spider-Man:
The Ultimate Villain Showdown","Avengers S.T.A.T.I.O.N.","Iron Man 3:
The Prologue","Captain America: Civil War Save a Hero Campaign","X-
Men: Evolution","Jessica Jones","Luke Cage","Agents of
S.H.I.E.L.D.","The Punisher","Batman v Superman: Dawn of
Justice","Justice Society: World War II","Young Justice","Justice
League Unlimited","Justice League","Justice League: The Flashpoint
Paradox","Justice League: War","Justice League vs. Teen
Titans","Justice League: Throne of Atlantis","DC Super Hero
Girls","Lego Batman: The Movie - DC Super Heroes Unite","Mortal Kombat
vs. DC Universe","JLA Adventures: Trapped in Time","Justice League:
Gods and Monsters Chronicles","The Super Powers Team: Galactic
Guardians","LEGO DC Comics Super Heroes: Aquaman - Rage of
Atlantis","SuperFriends: The Legendary Super Powers Show","The Omen
Legacy","Necessary Evil: Super-Villains of DC Comics","Dark
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Catwoman","Batman Heroes: Harvey Dent","Batman Villains: Bob the
Goon","Smallville: Justice and Doom","Batman Returns Villains: The
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Batman","Batman Heroes: Vicki Vale","Shadows of the Bat: The Cinematic
Saga of the Dark Knight - Reinventing a Hero","Batman Heroes:
Alexander Knox","Batman Heroes: Commissioner Gordon","Superman II:
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Beyond","Adventures of Superman","Batman: Soul of the Dragon","The New
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Thing","Batman Ninja","Batman: Gotham Knight","Batman: Bad
Blood","Batman: Arkham Asylum","Wonder Woman","Constantine: City of
Demons","Batman Beyond: Return of the Joker","Batman vs.
Robin","Superman: Doomsday","Superman/Batman: Public Enemies","Batman

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& Mr. Freeze: SubZero", "The Batman vs. Dracula", "Batman: The Telltale Series", "Green Lantern: First Flight", "Teen Titans: Trouble in Tokyo", "Batman Beyond: The Movie", "Gotham Girls", "Lego Batman: The Videogame", "Lobo", "Green Arrow", "The Fire Rises: The Creation and Impact of the Dark Knight Trilogy", "The World's Greatest SuperFriends", "Superman 50th Anniversary", "You Will Believe: The Cinematic Saga of Superman", "The Science of Superman", "First Flight: The Fleischer Superman Series", "DC Nation's Farm League", "Supergirl: The Making of the Movie", "The Making of 'Superman III'", "Shadows of the Bat: The Cinematic Saga of the Dark Knight - Dark Side of the Knight", "Taking Flight: The Development of 'Superman'", "Legends of the Dark Knight: The History of Batman", "Making 'Superman': Filming the Legend", "Batman Begins: Path to Discovery", "Batman: The Journey Begins", "The Mythology of Superman", "The Worst Batman Fanfilm Ever... Period", "Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Legend Reborn", "Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Gathering Storm", "The Making of 'Superman: The Movie'", "Saving Gotham City", "Batman: The Tumbler", "Beyond Batman: Bats, Mattes & Dark Nights - The Visual FX of Batman Returns", "Beyond Batman: Sleek, Sexy and Sinister - The Costumes of Batman Returns", "Wonder Woman: The Ultimate Feminist Icon", "The Complete Robin Storyboard Sequence", "Gotham City Rises", "Shadows of the Bat: The Cinematic Saga of the Dark Knight - The Road to Gotham City", "Beyond Batman: Inside the Elfman Studio - The Music of Batman Returns", "Beyond Batman: Making Up the Penguin", "The Making of 'Superman II'", "Beyond Batman: Assembling the Arctic Army", "Revolutionizing a Classic: From Comic Book to Television - The Evolution of Wonder Woman from Page to Screen", "Batman: Night's End", "Guarding the Balance: Batman and the JLA", "Beyond Batman: Gotham City Revisited - The Production Design of Batman Returns", "Shadows of the Bat: The Cinematic Saga of the Dark Knight - Batman Unbound", "The Death and Return of Superman", "Wonder Woman: A Subversive Dream", "Superman: The Mysterious Mr. Mist", "Batman: Partners in Peril", "Batman: Black and White", "Beware the Batman", "The Flash", "Lucifer", "DC's Legends of Tomorrow", "Black Lightning"], "legendgroup": "DC", "marker": {"color": "#EF553B", "size": [7, 151, 122, 42, 152, 162, 42, 123, 164, 143, 143, 132, 140, 126, 23, 125, 121, 121, 143, 114, 126, 124, 154, 23, 125, 127, 104, 23, 30, 83, 30, 30, 30, 91, 85, 75, 72, 0, 74, 6, 76, 80, 75, 67, 70, 83, 0, 77, 75, 132, 0, 0, 2, 1, 77, 30, 49, 89, 51, 13, 1, 60, 48, 30, 30, 41, 31, 14, 14, 20, 3, 31, 23, 52, 13, 14, 12, 13, 14, 4, 13, 18, 11, 8, 52, 10, 0, 15, 19, 11, 27, 0, 25, 0, 0, 3, 20, 42, 44, 42, 43], "sizemode": "area", "sizeref": 0.21875, "symbol": "circle"}, "mode": "markers", "name": "DC", "orientation": "v", "showlegend": true, "type": "scatter", "x": ["2021", null, null, "2012", null, null, "2014", null, null, null, null, null, null, null, "1992", null, null, null, null, null, null, null, null, "2003", null, null, null, "1999", "1952", null, "1997", "1996", "2004", null, null, "2008", "2016", "2009", "2009", "2018", "2000", "2015", "2007", "2009", "1998", "2005", "2016", "2009", "2006", "1999", "2000", "2008", null, null, "2013", "1979", "1988", "2006", "2006", "2006", "2012", "1984", "1985", "2005", "2001", "2005", "2001", "200


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Inspiration [Link](#)