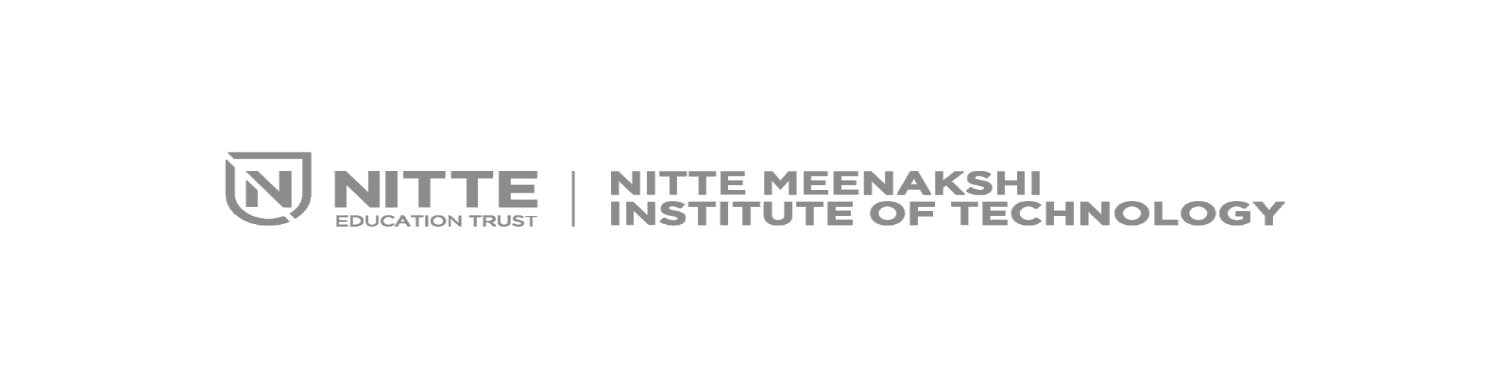
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**Department of Information Science & Engineering**

**Exploratory Data Analysis**

**Report (LA Assignment)**

**Submitted to**

**Dr. Manoj Kumar M V**

**Associate Professor**

**Department of Information Science and Engineering**

**Team Members**

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# Exploratory Data Analysis

We were given with dataset of Marvel and DC movies and their attributes Movie, Genre, Year, US\_Gross, Description, Votes, IMDB\_Score and MetaScores with names of associated Actors and Directors.

We shall prepare data, analyse it and compare the performance of marvel and DC movies on various parameters.

To begin with, we import the data set into a data frame named df, using read.csv function with sep=”,” to specify comma separated csv file.

marvelVsdc <- read.csv(file="Marvel\_DC\_imdb.csv")

df <- marvelvsdc

#load dataset

show(df)

X Movie Year Genre RunTime Rating

1 0 Eternals (2021) Action,Adventure,Drama

2 1 Loki (2021â€“ ) Action,Adventure,Fantasy

3 2 The Falcon and the Winter Soldier (2021) Action,Adventure,Drama 50 min TV-14

4 3 WandaVision (2021) Action,Comedy,Drama 350 min TV-PG

5 4 Spider-Man: No Way Home (2021) Action,Adventure,Sci-Fi

6 5 Black Widow (2021) Action,Adventure,Sci-Fi 133 min PG-13

7 6 Avengers: Endgame (2019) Action,Adventure,Drama 181 min PG-13

8 7 Guardians of the Galaxy (2014) Action,Adventure,Comedy 121 min PG-13

9 8 Thor: Love and Thunder (2022) Action,Adventure,Fantasy

10 9 Spider-Man: Far from Home (2019) Action,Adventure,Sci-Fi 129 min PG-13

11 10 Thor: Ragnarok (2017) Action,Adventure,Comedy 130 min PG-13

12 11 Avengers: Infinity War (2018) Action,Adventure,Sci-Fi 149 min PG-13

13 12 Black Panther (2018) Action,Adventure,Sci-Fi 134 min PG-13

14 13 Captain Marvel (2019) Action,Adventure,Sci-Fi 123 min PG-13

15 14 Shang-Chi and the Legend of the Ten Rings (2021) Action,Adventure,Fantasy

16 15 Spider-Man: Homecoming (2017) Action,Adventure,Sci-Fi 133 min PG-13

17 16 Avengers: Age of Ultron (2015) Action,Adventure,Sci-Fi 141 min PG-13

18 17 Captain America: The First Avenger (2011) Action,Adventure,Sci-Fi 124 min PG-13

19 18 Guardians of the Galaxy Vol. 2 (2017) Action,Adventure,Comedy 136 min PG-13

20 19 Thor (2011) Action,Adventure,Fantasy 115 min PG-13

21 20 Iron Man (2008) Action,Adventure,Sci-Fi 126 min PG-13

22 21 Captain America: Civil War (2016) Action,Adventure,Sci-Fi 147 min PG-13

23 22 The Avengers (2012) Action,Adventure,Sci-Fi 143 min PG-13

24 23 Doctor Strange in the Multiverse of Madness (2022) Action,Adventure,Fantasy

25 24 Brightburn (2019) Drama,Horror,Mystery 90 min R

26 25 Doctor Strange (2016) Action,Adventure,Fantasy 115 min PG-13

27 26 Ant-Man (2015) Action,Adventure,Comedy 117 min PG-13

28 27 Captain America: The Winter Soldier (2014) Action,Adventure,Sci-Fi 136 min PG-13

29 28 Iron Man 3 (2013) Action,Adventure,Sci-Fi 130 min PG-13

30 29 What If...? (2021â€“ ) Animation,Action,Adventure

31 30 Black Panther: Wakanda Forever (2022) Action,Adventure,Drama

32 31 Thor: The Dark World (2013) Action,Adventure,Fantasy 112 min PG-13

33 32 Iron Man 2 (2010) Action,Adventure,Sci-Fi 124 min PG-13

34 33 Spider-Man 3 (2007) Action,Adventure,Sci-Fi 139 min PG-13

35 34 Ant-Man and the Wasp (2018) Action,Adventure,Comedy 118 min PG-13

36 35 The Incredible Hulk (2008) Action,Adventure,Sci-Fi 112 min PG-13

37 36 Hawkeye (2021â€“ ) Action,Adventure,Crime 60 min

38 37 Guardians of the Galaxy Vol. 3 (2023) Action,Adventure,Comedy

39 38 The Marvels (2022) Action,Adventure,Fantasy

40 39 Moon Knight (2022â€“ ) Action,Adventure,Drama

41 40 Long Shot (2019) Comedy,Romance 125 min R

42 41 Ralph Breaks the Internet (2018) Animation,Adventure,Comedy 112 min PG

43 42 Fantastic 4: Rise of the Silver Surfer (2007) Action,Adventure,Fantasy 92 min PG

44 43 Ms. Marvel (2021â€“ ) Action,Adventure,Comedy

45 44 Fantastic Four Action,Adventure,Comedy

46 45 She-Hulk (2022â€“ ) Action,Adventure,Comedy

47 46 Secret Invasion Action,Adventure,Drama

48 47 Deadpool 3 Action,Comedy,Sci-Fi

49 48 Blade Action,Adventure,Fantasy

50 49 Guardians of the Galaxy: Inferno (2017 Video) Short,Comedy,Music 4 min Not Rated

51 50 Ironheart Action,Adventure,Drama

52 51 Armor Wars Action,Adventure,Drama

53 52 Punisher: War Zone (2008) Action,Crime,Drama 103 min R

54 53 Ant-Man and the Wasp: Quantumania (2023) Action,Adventure,Comedy

55 54 I Am Groot Action,Adventure,Comedy

56 55 Marvel Studios: Legends (2021â€“ ) Action,Fantasy,Sci-Fi 7 min TV-14

57 56 Mutant X (2001â€“2004) Action,Adventure,Drama 60 min TV-PG

58 57 Captain America 4 Action,Adventure,Sci-Fi

59 58 Marvel Studios: Assembled (2021â€“ ) Documentary 58 min TV-14

60 59 The Guardians of the Galaxy Holiday Special (2022 TV Special) Action,Adventure,Comedy

61 60 X-Men (2011) Animation,Action,Sci-Fi TV-14

62 61 Iron Man: Armored Adventures (2008â€“2012) Animation,Action,Adventure 22 min TV-Y7

63 62 Marvel One-Shot: Agent Carter (2013 Video) Short,Action,Adventure 15 min Not Rated

64 63 Team Thor (2016 Video) Short,Comedy,Fantasy 4 min Not Rated

65 64 The Oscars (2014 TV Special) Comedy,Music 175 min TV-14

66 65 Hulk Vs. (2009 Video) Animation,Action,Adventure 82 min PG-13

67 66 Wolverine (2011â€“ ) Animation,Action,Sci-Fi 23 min TV-14

68 67 The Oscars (2020 TV Special) Music 170 min TV-14

69 68 Avengers: Damage Control (2019 Video Game) Action

70 69 The Sinister Six Sci-Fi

71 70 Ultimate Avengers: The Movie (2006 Video) Animation,Action,Adventure 72 min PG-13

Director Actor

1 ChloÃ©Zhao AngelinaJolie,GemmaChan,RichardMadden,BarryKeoghan

2 TomHiddleston,OwenWilson,SophiaDiMartino,RichardE.Grant

3 AnthonyMackie,SebastianStan,WyattRussell,ErinKellyman

4 ElizabethOlsen,PaulBettany,KathrynHahn,TeyonahParris

5 JonWatts AngourieRice,TomHolland,Zendaya,MarisaTomei

6 CateShortland ScarlettJohansson,FlorencePugh,DavidHarbour,RachelWeisz

7 AnthonyRusso,JoeRusso RobertDowneyJr.,ChrisEvans,MarkRuffalo,ChrisHemsworth

8 JamesGunn ChrisPratt,VinDiesel,BradleyCooper,ZoeSaldana

9 TaikaWaititi ChrisPratt,KarenGillan,TaikaWaititi,TessaThompson

10 JonWatts TomHolland,SamuelL.Jackson,JakeGyllenhaal,MarisaTomei

11 TaikaWaititi ChrisHemsworth,TomHiddleston,CateBlanchett,MarkRuffalo

12 AnthonyRusso,JoeRusso RobertDowneyJr.,ChrisHemsworth,MarkRuffalo,ChrisEvans

13 RyanCoogler ChadwickBoseman,MichaelB.Jordan,LupitaNyong'o,DanaiGurira

14 AnnaBoden,RyanFleck BrieLarson,SamuelL.Jackson,BenMendelsohn,JudeLaw

15 DestinDanielCretton SimuLiu,Awkwafina,TonyChiu-WaiLeung,MichelleYeoh

16 JonWatts TomHolland,MichaelKeaton,RobertDowneyJr.,MarisaTomei

17 JossWhedon RobertDowneyJr.,ChrisEvans,MarkRuffalo,ChrisHemsworth

18 JoeJohnston ChrisEvans,HugoWeaving,SamuelL.Jackson,HayleyAtwell

19 JamesGunn ChrisPratt,ZoeSaldana,DaveBautista,VinDiesel

20 KennethBranagh ChrisHemsworth,AnthonyHopkins,NataliePortman,TomHiddleston

21 JonFavreau RobertDowneyJr.,GwynethPaltrow,TerrenceHoward,JeffBridges

22 AnthonyRusso,JoeRusso ChrisEvans,RobertDowneyJr.,ScarlettJohansson,SebastianStan

23 JossWhedon RobertDowneyJr.,ChrisEvans,ScarlettJohansson,JeremyRenner

24 SamRaimi RachelMcAdams,ElizabethOlsen,BenedictCumberbatch,ChiwetelEjiofor

25 DavidYarovesky ElizabethBanks,DavidDenman,JacksonA.Dunn,AbrahamClinkscales

26 ScottDerrickson BenedictCumberbatch,ChiwetelEjiofor,RachelMcAdams,BenedictWong

27 PeytonReed PaulRudd,MichaelDouglas,CoreyStoll,EvangelineLilly

28 AnthonyRusso,JoeRusso ChrisEvans,SamuelL.Jackson,ScarlettJohansson,RobertRedford

29 ShaneBlack RobertDowneyJr.,GuyPearce,GwynethPaltrow,DonCheadle

30 JeffreyWright,HayleyAtwell,JoshBrolin,DominicCooper

31 RyanCoogler MartinFreeman,AngelaBassett,LupitaNyong'o,DanaiGurira

32 AlanTaylor ChrisHemsworth,NataliePortman,TomHiddleston,StellanSkarsgÃ¥rd

33 JonFavreau RobertDowneyJr.,MickeyRourke,GwynethPaltrow,DonCheadle

34 SamRaimi TobeyMaguire,KirstenDunst,TopherGrace,ThomasHadenChurch

35 PeytonReed PaulRudd,EvangelineLilly,MichaelPeÃ±a,WaltonGoggins

36 LouisLeterrier EdwardNorton,LivTyler,TimRoth,WilliamHurt

37 AlaquaCox,Briand'ArcyJames,TonyDalton,VeraFarmiga

38 JamesGunn DaveBautista,ElizabethDebicki,ChrisPratt,KarenGillan

39 NiaDaCosta BrieLarson,ZaweAshton,TeyonahParris,ImanVellani

40 MayCalamawy,EthanHawke,OscarIsaac

41 JonathanLevine CharlizeTheron,SethRogen,JuneDianeRaphael,O'SheaJacksonJr.

42 PhilJohnston,RichMoore JohnC.Reilly,SarahSilverman,GalGadot,TarajiP.Henson

43 TimStory IoanGruffudd,JessicaAlba,ChrisEvans,MichaelChiklis

44 MattLintz,LaurelMarsden,RishShah,ImanVellani

45 or:JonWatts

46 TatianaMaslany,GingerGonzaga,TimRoth,MarkRuffalo

47 KingsleyBen-Adir,EmiliaClarke,OliviaColman,SamuelL.Jackson

48 yanReynolds

49 ahershalaAli

50 JamesGunn,DavidYarovesky DavidHasselhoff,ChrisPratt,DaveBautista,KarenGillan

51 ominiqueThorne

52 onCheadle

53 LexiAlexander RayStevenson,DominicWest,JulieBenz,DougHutchison

54 PeytonReed MichaelDouglas,EvangelineLilly,PaulRudd,MichellePfeiffer

55

56

57 VictoriaPratt,ForbesMarch,VictorWebster,JohnShea

58 nthonyMackie

59 KevinFeige,FlorencePugh,JacSchaeffer,NateMoore

60 JamesGunn DaveBautista,ChrisPratt,VinDiesel,PomKlementieff

61 SteveBlum,CamClarke,AyaHisakawa,KatsunosukeHori

62 AdrianPetriw,DanielBacon,AnnaCummer,LisaAnnBeley

63 LouisD'Esposito HayleyAtwell,BradleyWhitford,DominicCooper,TimTrobec

64 TaikaWaititi ChrisHemsworth,MarkRuffalo,DaleyPearson

65 HamishHamilton EllenDeGeneres,AnneHathaway,BarkhadAbdi,BradleyCooper

66 SamLiu,FrankPaur FredTatasciore,MatthewWolf,GrahamMcTavish,GreyGriffin

67 RikiyaKoyama,VicMignogna,MiloVentimiglia,RomiPak

68 GlennWeiss ZazieBeetz,KeanuReeves,TimothÃ©eChalamet,BradPitt

69 RyanBartley,BenedictCumberbatch,EvangelineLilly,RossMarquand

70

71 CurtGeda,StevenE.Gordon,BobRichardson JustinGross,GreyGriffin,MichaelMassee,MarcWorden

Description

1 The saga of the Eternals, a race of immortal beings who lived on Earth and shaped its history and civilizations.

2 A new Marvel chapter with Loki at its center.

3 Following the events of 'Avengers: Endgame,' Sam Wilson/Falcon and Bucky Barnes/Winter Soldier team up in a global adventure that tests their abilities -- and their patience.

4 Blends the style of classic sitcoms with the MCU, in which Wanda Maximoff and Vision - two super-powered beings living their ideal suburban lives - begin to suspect that everything is not as it seems.

5 A continuation of Spider-Man: Far From Home.

6 A film about Natasha Romanoff in her quests between the films Civil War and Infinity War.

7 After the devastating events of Avengers: Infinity War (2018), the universe is in ruins. With the help of remaining allies, the Avengers assemble once more in order to reverse Thanos' actions and restore balance to the universe.

8 A group of intergalactic criminals must pull together to stop a fanatical warrior with plans to purge the universe.

9 The sequel to Thor: Ragnarok and the fourth movie in the Thor saga.

10 Following the events of Avengers: Endgame (2019), Spider-Man must step up to take on new threats in a world that has changed forever.

11 Imprisoned on the planet Sakaar, Thor must race against time to return to Asgard and stop RagnarÃ¶k, the destruction of his world, at the hands of the powerful and ruthless villain Hela.

12 The Avengers and their allies must be willing to sacrifice all in an attempt to defeat the powerful Thanos before his blitz of devastation and ruin puts an end to the universe.

13 T'Challa, heir to the hidden but advanced kingdom of Wakanda, must step forward to lead his people into a new future and must confront a challenger from his country's past.

14 Carol Danvers becomes one of the universe's most powerful heroes when Earth is caught in the middle of a galactic war between two alien races.

15 The movie, based on Marvel Comics, will focus on Shang-Chi; 'The Master of Kung-Fu'.

16 Peter Parker balances his life as an ordinary high school student in Queens with his superhero alter-ego Spider-Man, and finds himself on the trail of a new menace prowling the skies of New York City.

17 When Tony Stark and Bruce Banner try to jump-start a dormant peacekeeping program called Ultron, things go horribly wrong and it's up to Earth's mightiest heroes to stop the villainous Ultron from enacting his terrible plan.

18 Steve Rogers, a rejected military soldier, transforms into Captain America after taking a dose of a "Super-Soldier serum". But being Captain America comes at a price as he attempts to take down a war monger and a terrorist organization.

19 The Guardians struggle to keep together as a team while dealing with their personal family issues, notably Star-Lord's encounter with his father the ambitious celestial being Ego.

20 The powerful but arrogant god Thor is cast out of Asgard to live amongst humans in Midgard (Earth), where he soon becomes one of their finest defenders.

21 After being held captive in an Afghan cave, billionaire engineer Tony Stark creates a unique weaponized suit of armor to fight evil.

22 Political involvement in the Avengers' affairs causes a rift between Captain America and Iron Man.

23 Earth's mightiest heroes must come together and learn to fight as a team if they are going to stop the mischievous Loki and his alien army from enslaving humanity.

24 Plot unknown. Sequel to the 2016 Marvel film 'Doctor Strange'.

25 What if a child from another world crash-landed on Earth, but instead of becoming a hero to mankind, he proved to be something far more sinister?

26 While on a journey of physical and spiritual healing, a brilliant neurosurgeon is drawn into the world of the mystic arts.

27 Armed with a super-suit with the astonishing ability to shrink in scale but increase in strength, cat burglar Scott Lang must embrace his inner hero and help his mentor, Dr. Hank Pym, plan and pull off a heist that will save the world.

28 As Steve Rogers struggles to embrace his role in the modern world, he teams up with a fellow Avenger and S.H.I.E.L.D agent, Black Widow, to battle a new threat from history: an assassin known as the Winter Soldier.

29 When Tony Stark's world is torn apart by a formidable terrorist called the Mandarin, he starts an odyssey of rebuilding and retribution.

30 Exploring pivotal moments from the Marvel Cinematic Universe and turning them on their head, leading the audience into uncharted territory.

31 A sequel that will continue to explore the incomparable world of Wakanda and all the rich and varied characters introduced in the 2018 film.

32 When the Dark Elves attempt to plunge the universe into darkness, Thor must embark on a perilous and personal journey that will reunite him with doctor Jane Foster.

33 With the world now aware of his identity as Iron Man, Tony Stark must contend with both his declining health and a vengeful mad man with ties to his father's legacy.

34 A strange black entity from another world bonds with Peter Parker and causes inner turmoil as he contends with new villains, temptations, and revenge.

35 As Scott Lang balances being both a superhero and a father, Hope van Dyne and Dr. Hank Pym present an urgent new mission that finds the Ant-Man fighting alongside The Wasp to uncover secrets from their past.

36 Bruce Banner, a scientist on the run from the U.S. Government, must find a cure for the monster he turns into whenever he loses his temper.

37 Series based on the Marvel Comics superhero Hawkeye, centering on the adventures of Young Avenger, Kate Bishop, who took on the role after the original Avenger, Clint Barton.

38 Plot unknown. Third installment of the 'Guardians of the Galaxy' franchise.

39 Sequel of the 2019 title 'Captain Marvel'.

40 Marc Spector is a former CIA agent whose life is saved by the Moon God, Khonshu.

41 Journalist Fred Flarsky reunites with his childhood crush, Charlotte Field, now one of the most influential women in the world. As she prepares to make a run for the Presidency, Charlotte hires Fred as her speechwriter and sparks fly.

42 Six years after the events of "Wreck-It Ralph," Ralph and Vanellope, now friends, discover a wi-fi router in their arcade, leading them into a new adventure.

43 The Fantastic Four learn that they aren't the only super-powered beings in the universe when they square off against the powerful Silver Surfer and the planet-eating Galactus.

44 New Jersey raised Kamala Khan learns she has polymorphous powers.

45 One of Marvel's most iconic families makes it to the big screen: the Fantastic Four.

46 Jennifer Walters acquires Hulk-like qualities.

47 Fury and Talos try to stop the Skrulls who have infiltrated the highest spheres of the Marvel Universe.

48 The film is rumored to involve another popular group in the X-Men mythos, X-Force.

49 Plot is unknown at this time.

50 A Guardians of the Galaxy video, the Guardians Inferno, featuring 80s pop star Zardu Hasselfrau.

51 The genius teenage-girl inventor Riri Williams creates the most advanced suit of armor since Iron Man.

52 Find out in this series what would happen if Tony Stark's tech fell into the wrong hands.

53 Frank Castle, known as the Punisher, ruthlessly demolishes organized crime, but it starts an even bigger war.

54 The further adventures of Ant-Man and the Wasp.

55 A series of shorts featuring the seedling Groot along with several new and unusual characters.

56 This series showcases individual characters from the MCU viewers have come to know and love over the years and revisit some of their most iconic moments.

57 A fugitive geneticist and four of his "creations" search for others of their kind while attempting to stay a step ahead of a morally ambiguous government agent.

58 Plot kept under wraps. Fourth movie in the Captain America franchise.

59 Assembled is a comprehensive documentary series that chronicles the creation of Marvel Studios' thrilling new shows and theatrical releases. Assembled is an immersive, and in-depth examination of the next phase of the MCU.

60 Watch the Guardians Star-Lord, Gamora, Drax, Rocket, and Groot engage in some spirited shenanigans in an all-new original special created for Disney+.

61 X-Men, still grieving over the death of Phoenix (Jean Grey), are investigating a case of a missing mutant girl in Northern Japan. This leads them to a mysterious virus that turns mutants into monsters. U-Men and the Inner Circle want it.

62 A teenage Tony Stark battles evil with his revolutionary power armor technology.

63 Frustrated at being marginalized at work, Peggy Carter goes on an unauthorized solo field mission.

64 The story of what the hammer-wielding Nordic god Thor was up to while the rest of the Avengers were battling each other in "Captain America: Civil War". He moves into a flat with office worker Darryl Jacobson in Australia.

65 The Academy of Motion Picture Arts and Sciences celebrates the previous year's (2013) achievements in film.

66 Two stories featuring Marvel's anti-hero The Incredible Hulk and his encounters with the X-Man Wolverine and the god known as Thor.

67 Logan is asked by his old friend, a cop from Japan, to help him take down Shingen Yashida's crime syndicate and save Mariko, Logan's lost love, from forced marriage arranged by her father Shingen. Yukio, a female assassin, helps him.

68 The 92nd Academy Awards for film achievements in 2019 are presented by the Academy of Motion Picture Arts and Sciences.

69 Join Shuri on an adventure where you are the hero. Combining Wakandan and stark technology you will become a superhero yourself. Fight along Doctor Strange, Ant-Man, The Wasp and many more against an old foe from long ago..

70 Plot unknown. Feature film based on the Marvel Comics series about a team of supervillians.

71 To confront an alien menace, General Fury assembles a team of superheroes lead by a recently resuscitated Captain America.

IMDB\_Score Metascore Votes USA\_Gross Category

1 NA Marvel

2 NA Marvel

3 7.5 NA 105,557 Marvel

4 8.1 NA 174,710 Marvel

5 NA Marvel

6 NA Marvel

7 8.4 78 880,911 $858.37M Marvel

8 8.0 76 1,066,222 $333.18M Marvel

9 NA Marvel

10 7.5 69 348,047 $390.53M Marvel

11 7.9 74 615,860 $315.06M Marvel

12 8.4 68 881,638 $678.82M Marvel

13 7.3 88 652,032 $700.06M Marvel

14 6.9 64 470,319 $426.83M Marvel

15 NA Marvel

16 7.4 73 532,946 $334.20M Marvel

17 7.3 66 769,385 $459.01M Marvel

18 6.9 66 761,947 $176.65M Marvel

19 7.6 67 589,362 $389.81M Marvel

20 7.0 57 764,898 $181.03M Marvel

21 7.9 79 960,817 $318.41M Marvel

22 7.8 75 686,621 $408.08M Marvel

23 8.0 69 1,283,515 $623.28M Marvel

24 NA Marvel

25 6.1 44 84,999 $17.30M Marvel

26 7.5 72 619,963 $232.64M Marvel

27 7.3 64 588,231 $180.20M Marvel

28 7.7 70 756,882 $259.77M Marvel

29 7.1 62 772,986 $409.01M Marvel

30 NA NA Marvel

31 NA NA Marvel

32 6.9 54 611,700 $206.36M Marvel

33 7.0 57 739,920 $312.43M Marvel

34 6.2 59 509,072 $336.53M Marvel

35 7.0 70 327,092 $216.65M Marvel

36 6.7 61 444,258 $134.52M Marvel

37 NA NA Marvel

38 NA NA Marvel

39 NA NA Marvel

40 NA NA Marvel

41 6.8 67 99,733 $30.32M Marvel

42 7.0 71 137,872 $201.09M Marvel

43 5.6 45 253,509 $131.92M Marvel

44 NA NA Marvel

45 NA NA Marvel

46 NA NA Marvel

47 NA NA Marvel

48 NA NA Marvel

49 NA NA Marvel

50 8.1 NA 1,571 Marvel

51 NA NA Marvel

52 NA NA Marvel

53 5.9 30 60,678 $7.95M Marvel

54 NA NA Marvel

55 NA NA Marvel

56 6.5 NA 2,687 Marvel

57 5.9 NA 3,982 Marvel

58 NA NA Marvel

59 8.0 NA 1,120 Marvel

60 NA NA Marvel

61 6.9 NA 1,867 Marvel

62 6.5 NA 3,103 Marvel

63 7.6 NA 8,192 Marvel

64 8.1 NA 8,154 Marvel

65 7.8 NA 3,900 Marvel

66 7.0 NA 11,785 Marvel

67 6.4 NA 1,263 Marvel

68 6.6 NA 982 Marvel

69 6.6 NA 33 Marvel

70 NA NA Marvel

71 6.7 NA 12,057 Marvel

[ reached 'max' / getOption("max.print") -- omitted 1619 rows ]

> marvelVsdc <- read.csv(file="Marvel\_DC\_imdb.csv")

> #load dataset

>

> show(df)

The data set we are looking at the movies made by marvel and DC comics and their attributes. We shall prepare analyse the data and find insights from the given dataset.

DATA PREPARATION

1.Null values

sum(is.na(df))

[1] 1829

We observe that there are 1829 observations of NULL valve

Using the function omit to remove the NULL values

df <-na.omit(df)

After this we summarize our data using the summary method.

summary(df)

X Movie Year Genre RunTime Rating Director

Min. : 6.0 Length:65 Length:65 Length:65 Length:65 Length:65 Length:65

1st Qu.: 25.0 Class :character Class :character Class :character Class :character Class :character Class :character

Median :394.0 Mode :character Mode :character Mode :character Mode :character Mode :character Mode :character

Mean :237.7

3rd Qu.:418.0

Max. :471.0

Actor Description IMDB\_Score Metascore Votes USA\_Gross Category

Length:65 Length:65 Min. :3.400 Min. :27.00 Length:65 Length:65 Length:65

Class :character Class :character 1st Qu.:6.100 1st Qu.:53.00 Class :character Class :character Class :character

Mode :character Mode :character Median :7.000 Median :64.00 Mode :character Mode :character Mode :character

Mean :6.838 Mean :61.23

3rd Qu.:7.600 3rd Qu.:71.00

Max. :9.000 Max. :88.00

sum(is.na(ddf))

[1] 0

2. Converting the non numeric columns into numeric data

Votes, Gross, RunTime, Year have to be converted to numeric data

thevotes <- gsub("[,]","", ddf$Votes)

df["thevotes"]<-as.numeric(thevotes)

Gross\_US <- gsub("[,$M]","", ddf$USA\_Gross)

df[“Gross\_US”]<- as.numeric(Gross\_US)

Time <- gsub("[min]","", ddf$RunTime)

ddf["Time"]<-as.numeric(Time)

Release <- gsub("[(,)]","", ddf$Year)

ddf["TRelease"]<-as.numeric(Release)

Adding columns thevotes, Gross\_US, Time, TRelease in numeric value

## PLOTS

#### Histograms

We plot the histograms of each variable using the hist() function.

hist(ddf$IMDB\_Score)

Chart, box and whisker chart

Description automatically generated

We observe that most movies lie between the score of 6.5 to 7 rating in IMDB.While there is significant volume in the range of 7 to 8.

hist(ddf$Gross\_US, xlab = "US Box Office Collections (in million$ )",col = "yellow", border = "blue")

Chart, histogram

Description automatically generated

It is observed that while most movies do well at US box office and mostly earn under $400M there exists a movie that has crossed $800M mark!

hist(ddf$TRelease,xlab = "Year",col = "Orange",border = "brown")

Chart, histogram

Description automatically generated

We observe that continuous exponential number of releases, starting from year 2000 to 2020.

hist(ddf$Time,xlab = "Runtime(min)",col = "magenta",border = "black")

Chart, histogram

Description automatically generated

Let us take a look how Marvel movies and DC movies fare on parameters of popularity, gross in US, and rating.

1.Let us take a look a most popular movies in Marvel and DC (by votes)

highestVotes <- ddf %>% filter(thevotes >= 10000) %>%arrange(desc(thevotes))

> head(highestVotes,10)

X Movie Year Genre RunTime Rating Director

1 435 Superman II (1980) Action,Adventure,Sci-Fi 127 min PG RichardLester,RichardDonner

2 40 Long Shot (2019) Comedy,Romance 125 min R JonathanLevine

3 20 Iron Man (2008) Action,Adventure,Sci-Fi 126 min PG-13 JonFavreau

4 11 Avengers: Infinity War (2018) Action,Adventure,Sci-Fi 149 min PG-13 AnthonyRusso,JoeRusso

5 6 Avengers: Endgame (2019) Action,Adventure,Drama 181 min PG-13 AnthonyRusso,JoeRusso

6 407 Catch Me If You Can (2002) Biography,Crime,Drama 141 min PG-13 StevenSpielberg

7 24 Brightburn (2019) Drama,Horror,Mystery 90 min R DavidYarovesky

8 28 Iron Man 3 (2013) Action,Adventure,Sci-Fi 130 min PG-13 ShaneBlack

9 16 Avengers: Age of Ultron (2015) Action,Adventure,Sci-Fi 141 min PG-13 JossWhedon

10 19 Thor (2011) Action,Adventure,Fantasy 115 min PG-13 KennethBranagh

Description

1 Superman agrees to sacrifice his powers to start a relationship with Lois Lane, unaware that three Kryptonian criminals he inadvertently released are conquering Earth.

2 Journalist Fred Flarsky reunites with his childhood crush, Charlotte Field, now one of the most influential women in the world. As she prepares to make a run for the Presidency, Charlotte hires Fred as her speechwriter and sparks fly.

3 After being held captive in an Afghan cave, billionaire engineer Tony Stark creates a unique weaponized suit of armor to fight evil.

4 The Avengers and their allies must be willing to sacrifice all in an attempt to defeat the powerful Thanos before his blitz of devastation and ruin puts an end to the universe.

5 After the devastating events of Avengers: Infinity War (2018), the universe is in ruins. With the help of remaining allies, the Avengers assemble once more in order to reverse Thanos' actions and restore balance to the universe.

6 Barely 21 yet, Frank is a skilled forger who has passed as a doctor, lawyer and pilot. FBI agent Carl becomes obsessed with tracking down the con man, who only revels in the pursuit.

7 What if a child from another world crash-landed on Earth, but instead of becoming a hero to mankind, he proved to be something far more sinister?

8 When Tony Stark's world is torn apart by a formidable terrorist called the Mandarin, he starts an odyssey of rebuilding and retribution.

9 When Tony Stark and Bruce Banner try to jump-start a dormant peacekeeping program called Ultron, things go horribly wrong and it's up to Earth's mightiest heroes to stop the villainous Ultron from enacting his terrible plan.

10 The powerful but arrogant god Thor is cast out of Asgard to live amongst humans in Midgard (Earth), where he soon becomes one of their finest defenders.

IMDB\_Score Metascore Votes USA\_Gross Category Time TRelease

1 6.8 83 99,747 $108.19M DC 127 1980

2 6.8 67 99,733 $30.32M Marvel 125 2019

3 7.9 79 960,817 $318.41M Marvel 126 2008

4 8.4 68 881,638 $678.82M Marvel 149 2018

5 8.4 78 880,911 $858.37M Marvel 181 2019

6 8.1 75 858,343 $164.62M DC 141 2002

7 6.1 44 84,999 $17.30M Marvel 90 2019

8 7.1 62 772,986 $409.01M Marvel 130 2013

9 7.3 66 769,385 $459.01M Marvel 141 2015

10 7.0 57 764,898 $181.03M Marvel 115 2011

We observe that 8 Marvel movies have been among the top 10 highest voted movies.

Thus, Marvel movies are more popular than DC by audience.

highestGross <- ddf %>%arrange(desc(Gross\_US))

>

> head(highestGross,10)

X Movie Year Genre RunTime Rating Director

1 6 Avengers: Endgame (2019) Action,Adventure,Drama 181 min PG-13 AnthonyRusso,JoeRusso

2 416 Constantine (2005) Action,Fantasy,Horror 121 min R FrancisLawrence

3 453 Fred Claus (2007) Comedy,Family,Fantasy 116 min PG DavidDobkin

4 12 Black Panther (2018) Action,Adventure,Sci-Fi 134 min PG-13 RyanCoogler

5 410 V for Vendetta (2005) Action,Drama,Sci-Fi 132 min R JamesMcTeigue

6 52 Punisher: War Zone (2008) Action,Crime,Drama 103 min R LexiAlexander

7 11 Avengers: Infinity War (2018) Action,Adventure,Sci-Fi 149 min PG-13 AnthonyRusso,JoeRusso

8 22 The Avengers (2012) Action,Adventure,Sci-Fi 143 min PG-13 JossWhedon

9 432 Superman III (1983) Action,Adventure,Comedy 125 min PG RichardLester

10 394 The Dark Knight (2008) Action,Crime,Drama 152 min PG-13 ChristopherNolan

IMDB\_Score Metascore Votes USA\_Gross Category Time TRelease

1 8.4 78 880,911 $858.37M Marvel 181 2019

2 7.0 50 314,439 $75.98M DC 121 2005

3 5.6 42 40,992 $72.01M DC 116 2007

4 7.3 88 652,032 $700.06M Marvel 134 2018

5 8.1 62 1,049,937 $70.51M DC 132 2005

6 5.9 30 60,678 $7.95M Marvel 103 2008

7 8.4 68 881,638 $678.82M Marvel 149 2018

8 8.0 69 1,283,515 $623.28M Marvel 143 2012

9 5.0 44 65,178 $59.95M DC 125 1983

10 9.0 84 2,361,064 $534.86M DC 152 2008

We see that Marvel wins the highest grossing tag, but both have equal no. of movies in top 10 highest grossing movies, hence both would be winners in this quota.

Let us look at the top 10 highest rated movies

> highestrated <- ddf %>% filter(IMDB\_Score >= 8) %>%arrange(desc(IMDB\_Score, MetaScore))

> head(highestrated,10)

X Movie Year Genre RunTime Rating Director

1 394 The Dark Knight (2008) Action,Crime,Drama 152 min PG-13 ChristopherNolan

2 6 Avengers: Endgame (2019) Action,Adventure,Drama 181 min PG-13 AnthonyRusso,JoeRusso

3 11 Avengers: Infinity War (2018) Action,Adventure,Sci-Fi 149 min PG-13 AnthonyRusso,JoeRusso

4 392 Joker (2019) Crime,Drama,Thriller 122 min R ToddPhillips

5 399 The Dark Knight Rises (2012) Action,Adventure 164 min PG-13 ChristopherNolan

6 408 Batman Begins (2005) Action,Adventure 140 min PG-13 ChristopherNolan

7 407 Catch Me If You Can (2002) Biography,Crime,Drama 141 min PG-13 StevenSpielberg

8 410 V for Vendetta (2005) Action,Drama,Sci-Fi 132 min R JamesMcTeigue

9 7 Guardians of the Galaxy (2014) Action,Adventure,Comedy 121 min PG-13 JamesGunn

10 22 The Avengers (2012) Action,Adventure,Sci-Fi 143 min PG-13 JossWhedon

Actor

1 ChristianBale,HeathLedger,AaronEckhart,MichaelCaine

2 RobertDowneyJr.,ChrisEvans,MarkRuffalo,ChrisHemsworth

3 RobertDowneyJr.,ChrisHemsworth,MarkRuffalo,ChrisEvans

4 JoaquinPhoenix,RobertDeNiro,ZazieBeetz,FrancesConroy

5 ChristianBale,TomHardy,AnneHathaway,GaryOldman

6 ChristianBale,MichaelCaine,KenWatanabe,LiamNeeson

7 LeonardoDiCaprio,TomHanks,ChristopherWalken,MartinSheen

8 HugoWeaving,NataliePortman,RupertGraves,StephenRea

9 ChrisPratt,VinDiesel,BradleyCooper,ZoeSaldana

10 RobertDowneyJr.,ChrisEvans,ScarlettJohansson,JeremyRenner

Description

1 When the menace known as the Joker wreaks havoc and chaos on the people of Gotham, Batman must accept one of the greatest psychological and physical tests of his ability to fight injustice.

2 After the devastating events of Avengers: Infinity War (2018), the universe is in ruins. With the help of remaining allies, the Avengers assemble once more in order to reverse Thanos' actions and restore balance to the universe.

3 The Avengers and their allies must be willing to sacrifice all in an attempt to defeat the powerful Thanos before his blitz of devastation and ruin puts an end to the universe.

4 In Gotham City, mentally troubled comedian Arthur Fleck is disregarded and mistreated by society. He then embarks on a downward spiral of revolution and bloody crime. This path brings him face-to-face with his alter-ego: the Joker.

5 Eight years after the Joker's reign of anarchy, Batman, with the help of the enigmatic Catwoman, is forced from his exile to save Gotham City from the brutal guerrilla terrorist Bane.

6 After training with his mentor, Batman begins his fight to free crime-ridden Gotham City from corruption.

7 Barely 21 yet, Frank is a skilled forger who has passed as a doctor, lawyer and pilot. FBI agent Carl becomes obsessed with tracking down the con man, who only revels in the pursuit.

8 In a future British tyranny, a shadowy freedom fighter, known only by the alias of "V", plots to overthrow it with the help of a young woman.

9 A group of intergalactic criminals must pull together to stop a fanatical warrior with plans to purge the universe.

10 Earth's mightiest heroes must come together and learn to fight as a team if they are going to stop the mischievous Loki and his alien army from enslaving humanity.

IMDB\_Score Metascore Votes USA\_Gross Category Time TRelease

1 9.0 84 2,361,064 $534.86M DC 152 2008

2 8.4 78 880,911 $858.37M Marvel 181 2019

3 8.4 68 881,638 $678.82M Marvel 149 2018

4 8.4 59 1,004,600 $335.45M DC 122 2019

5 8.4 78 1,547,852 $448.14M DC 164 2012

6 8.2 70 1,334,536 $206.85M DC 140 2005

7 8.1 75 858,343 $164.62M DC 141 2002

8 8.1 62 1,049,937 $70.51M DC 132 2005

9 8.0 76 1,066,222 $333.18M Marvel 121 2014

10 8.0 69 1,283,515 $623.28M Marvel 143 2012

We observed that DC is clear winner here and can concluded that DC makes better movies than marvel.

**It is always said that high grossing movies are not good movies in comic book movies.**

Lets check the accuracy of this statement

ggplot(ddf, aes(x=Gross\_US, y=IMDB\_Score, colour = Category, size = Gross\_US)) +

geom\_point() +

ggtitle("Gross vs IMDB-Score") + theme\_light() + ylab("IMDB-Rating")

Chart, scatter chart

Description automatically generated

Thus, the above statement is not true.

Thus, our insights from the explanatory data analysis of Marvel and DC movies are:

1. Both the movies mostly earn under $400m, but an outlier (Avengers :Endgame(2020)) records earning of more than $800m!
2. Both have a majority runtime around 90 to 150 min, an outlier (Avengers :Endgame(2020)) records runtime of 182 min!
3. Marvel movies are more popular than DC movies.
4. DC movies in terms of making highly rated movies by critics, is a winner by a significant margin.
5. We see that Marvel wins the highest grossing tag, but both have equal no. of movies in top 10 highest grossing movies, hence both would be winners in this quota.
6. In case of Marvel movies, all their highly rated movies also fare well on US box, while the same trend is true but not for all DC movies.
7. Contrary to common notion that high grossing movies are not good movies at all, our visualization shows that Comic book movies, specially in the case of Marvel can do well in both cases.
8. MetaScore and IMDB are equally reliable they both are almost equal in for the given dataset.