

Stat341_Assignment1

20726577

24/01/2021

Question 4: Game of throne analysis

```
# Read in a .csv file
df_got <- read.csv(file = "GOT.csv", header = TRUE)
head(df_got, n = 5)
```

```
##      i..Season Episode_Number Number_in_Season
## 1          1             1             1
## 2          1             2             2
## 3          1             3             3
## 4          1             4             4
## 5          1             5             5
##
##              Episode_Name      Director
## 1      Winter Is Coming Tim Van Patten
## 2      The Kingsroad Tim Van Patten
## 3      Lord Snow      Brian Kirk
## 4 Cripples, Bastards, and Broken Things      Brian Kirk
## 5      The Wolf and the Lion      Brian Kirk
##
##              Writer Original_Air_Date US_Viewers Runtime
## 1 David Benioff & D. B. Weiss      17-Apr-11      2.22      62
## 2 David Benioff & D. B. Weiss      24-Apr-11      2.20      56
## 3 David Benioff & D. B. Weiss      01-May-11      2.44      58
## 4      Bryan Cogman      08-May-11      2.45      56
## 5 David Benioff & D. B. Weiss      15-May-11      2.58      55
##
## 1 Jon Arryn, the Hand of the King, is dead. King Robert Baratheon plans to ask his oldest friend, Edmure Tully, to marry his daughter, Lysa Arryn, at the Vale, to seal the peace between the North and the Crown. While Bran recovers from his injuries, the Stark family is left to wonder what will happen to the kingdom.
## 2
## 3
## 4
## 5      Catelyn has captured Tyrion and plans to bring him to her sister, Lysa Arryn, at the Vale, to seal the peace between the North and the Crown.
##      IMDb_Rating Notable_Death_Count
## 1          9.0             4
## 2          8.8             3
## 3          8.7             0
## 4          8.8             1
## 5          9.1             5
```

```
# order IMDb_Rating from highest to lowest
df_got[order(df_got$IMDb_Rating,decreasing = TRUE),]
```

##	i..Season	Episode_Number	Number_in_Season
## 29	3	29	9
## 48	5	48	8
## 59	6	59	9
## 60	6	60	10
## 64	7	64	4
## 19	2	19	9
## 32	4	32	2
## 36	4	36	6
## 38	4	38	8
## 40	4	40	10
## 55	6	55	5
## 9	1	9	9
## 24	3	24	4
## 39	4	39	9
## 67	7	67	7
## 10	1	10	10
## 49	5	49	9
## 52	6	52	2
## 20	2	20	10
## 7	1	7	7
## 63	7	63	3
## 6	1	6	6
## 30	3	30	10
## 37	4	37	7
## 54	6	54	4
## 66	7	66	6
## 5	1	5	5
## 8	1	8	8
## 16	2	16	6
## 28	3	28	8
## 31	4	31	1
## 47	5	47	7
## 50	5	50	10
## 1	1	1	1
## 17	2	17	7
## 25	3	25	5
## 62	7	62	2
## 65	7	65	5
## 11	2	11	1
## 13	2	13	3
## 14	2	14	4
## 15	2	15	5
## 18	2	18	8
## 21	3	21	1
## 23	3	23	3
## 26	3	26	6
## 33	4	33	3
## 34	4	34	4
## 2	1	2	2
## 4	1	4	4
## 27	3	27	7
## 35	4	35	5
## 44	5	44	4

## 53	6	53	3
## 3	1	3	3
## 22	3	22	2
## 45	5	45	5
## 57	6	57	7
## 61	7	61	1
## 12	2	12	2
## 41	5	41	1
## 42	5	42	2
## 43	5	43	3
## 51	6	51	1
## 56	6	56	6
## 58	6	58	8
## 46	5	46	6
## 69	8	69	2
## 68	8	68	1
## 70	8	70	3
## 72	8	72	5
## 71	8	71	4
## 73	8	73	6

##	Episode_Name	Director
## 29	The Rains of Castamere	David Nutter
## 48	Hardhome	Miguel Sapochnik
## 59	Battle of the Bastards	Miguel Sapochnik
## 60	The Winds of Winter	Miguel Sapochnik
## 64	The Spoils of War	Matt Shakman
## 19	Blackwater	Neil Marshall
## 32	The Lion and the Rose	Alex Graves
## 36	The Laws of Gods and Men	Alik Sakharov
## 38	The Mountain and the Viper	Alex Graves
## 40	The Children	Alex Graves
## 55	The Door	Jack Bender
## 9	Baelor	Alan Taylor
## 24	And Now His Watch Is Ended	Alex Graves
## 39	The Watchers on the Wall	Neil Marshall
## 67	The Dragon and the Wolf	Jeremy Podeswa
## 10	Fire and Blood	Alan Taylor
## 49	The Dance of Dragons	David Nutter
## 52	Home	Jeremy Podeswa
## 20	Valar Morghulis	Alan Taylor
## 7	You Win or You Die	Daniel Minahan
## 63	The Queen's Justice	Mark Mylod
## 6	A Golden Crown	Daniel Minahan
## 30	Mhysa	David Nutter
## 37	Mockingbird	Alik Sakharov
## 54	Book of the Stranger	Daniel Sackheim
## 66	Beyond the Wall	Alan Taylor
## 5	The Wolf and the Lion	Brian Kirk
## 8	The Pointy End	Daniel Minahan
## 16	The Old Gods and the New	David Nutter
## 28	Second Sons	Michelle MacLaren
## 31	Two Swords	D. B. Weiss
## 47	The Gift	Miguel Sapochnik
## 50	Mother's Mercy	David Nutter

## 1	Winter Is Coming	Tim Van Patten
## 17	A Man Without Honor	David Nutter
## 25	Kissed by Fire	Alex Graves
## 62	Stormborn	Mark Mylod
## 65	Eastwatch	Matt Shakman
## 11	The North Remembers	Alan Taylor
## 13	What Is Dead May Never Die	Alik Sakharov
## 14	Garden of Bones	David Petrarca
## 15	The Ghost of Harrenhal	David Petrarca
## 18	The Prince of Winterfell	Alan Taylor
## 21	Valar Dohaeris	Daniel Minahan
## 23	Walk of Punishment	David Benioff
## 26	The Climb	Alik Sakharov
## 33	Breaker of Chains	Alex Graves
## 34	Oathkeeper	Michelle MacLaren
## 2	The Kingsroad	Tim Van Patten
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## 27	The Bear and the Maiden Fair	Michelle MacLaren
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## 61	Dragonstone	Jeremy Podeswa
## 12	The Night Lands	Alan Taylor
## 41	The Wars to Come	Michael Slovis
## 42	The House of Black and White	Michael Slovis
## 43	High Sparrow	Mark Mylod
## 51	The Red Woman	Jeremy Podeswa
## 56	Blood of My Blood	Jack Bender
## 58	No One	Mark Mylod
## 46	Unbowed, Unbent, Unbroken	Jeremy Podeswa
## 69	A Knight of the Seven Kingdoms	David Nutter
## 68	Winterfell	David Nutter
## 70	The Long Night	Miguel Sapochnik
## 72	The Bells	Miguel Sapochnik
## 71	The Last of the Starks	David Nutter
## 73	The Iron Throne	David Benioff & D. B. Weiss
##	Writer Original_Air_Date US_Viewers Runtime	
## 29	David Benioff & D. B. Weiss	02-Jun-13 5.22 51
## 48	David Benioff & D. B. Weiss	31-May-15 7.01 61
## 59	David Benioff & D. B. Weiss	19-Jun-16 7.66 60
## 60	David Benioff & D. B. Weiss	26-Jun-16 8.89 68
## 64	David Benioff & D. B. Weiss	06-Aug-17 10.17 50
## 19	George R. R. Martin	27-May-12 3.38 55
## 32	George R. R. Martin	13-Apr-14 6.31 52
## 36	Bryan Cogman	11-May-14 6.40 51
## 38	David Benioff & D. B. Weiss	01-Jun-14 7.17 52
## 40	David Benioff & D. B. Weiss	15-Jun-14 7.09 65
## 55	David Benioff & D. B. Weiss	22-May-16 7.89 57
## 9	David Benioff & D. B. Weiss	12-Jun-11 2.66 57
## 24	David Benioff & D. B. Weiss	21-Apr-13 4.87 53

## 39	David Benioff & D. B. Weiss	08-Jun-14	6.95	51
## 67	David Benioff & D. B. Weiss	27-Aug-17	12.07	80
## 10	David Benioff & D. B. Weiss	19-Jun-11	3.04	53
## 49	David Benioff & D. B. Weiss	07-Jun-15	7.14	52
## 52	Dave Hill	01-May-16	7.29	54
## 20	David Benioff & D. B. Weiss	03-Jun-12	4.20	64
## 7	David Benioff & D. B. Weiss	29-May-11	2.40	58
## 63	David Benioff & D. B. Weiss	30-Jul-17	9.25	63
## 6	David Benioff & D. B. Weiss	22-May-11	2.44	53
## 30	David Benioff & D. B. Weiss	09-Jun-13	5.39	63
## 37	David Benioff & D. B. Weiss	18-May-14	7.20	51
## 54	David Benioff & D. B. Weiss	15-May-16	7.82	59
## 66	David Benioff & D. B. Weiss	20-Aug-17	10.24	70
## 5	David Benioff & D. B. Weiss	15-May-11	2.58	55
## 8	George R. R. Martin	05-Jun-11	2.72	59
## 16	Vanessa Taylor	06-May-12	3.88	54
## 28	David Benioff & D. B. Weiss	19-May-13	5.13	56
## 31	David Benioff & D. B. Weiss	06-Apr-14	6.64	58
## 47	David Benioff & D. B. Weiss	24-May-15	5.40	59
## 50	David Benioff & D. B. Weiss	14-Jun-15	8.11	60
## 1	David Benioff & D. B. Weiss	17-Apr-11	2.22	62
## 17	David Benioff & D. B. Weiss	13-May-12	3.69	56
## 25	Bryan Cogman	28-Apr-13	5.35	57
## 62	Bryan Cogman	23-Jul-17	9.27	59
## 65	Dave Hill	13-Aug-17	10.72	59
## 11	David Benioff & D. B. Weiss	01-Apr-12	3.86	53
## 13	Bryan Cogman	15-Apr-12	3.77	53
## 14	Vanessa Taylor	22-Apr-12	3.65	51
## 15	David Benioff & D. B. Weiss	29-Apr-12	3.90	55
## 18	David Benioff & D. B. Weiss	20-May-12	3.86	54
## 21	David Benioff & D. B. Weiss	31-Mar-13	4.37	55
## 23	David Benioff & D. B. Weiss	14-Apr-13	4.72	56
## 26	David Benioff & D. B. Weiss	05-May-13	5.50	53
## 33	David Benioff & D. B. Weiss	20-Apr-14	6.59	57
## 34	Bryan Cogman	27-Apr-14	6.95	55
## 2	David Benioff & D. B. Weiss	24-Apr-11	2.20	56
## 4	Bryan Cogman	08-May-11	2.45	56
## 27	George R. R. Martin	12-May-13	4.84	58
## 35	David Benioff & D. B. Weiss	04-May-14	7.16	53
## 44	Dave Hill	03-May-15	6.82	51
## 53	David Benioff & D. B. Weiss	08-May-16	7.28	52
## 3	David Benioff & D. B. Weiss	01-May-11	2.44	58
## 22	Vanessa Taylor	07-Apr-13	4.27	56
## 45	Bryan Cogman	10-May-15	6.56	57
## 57	Bryan Cogman	05-Jun-16	7.80	51
## 61	David Benioff & D. B. Weiss	16-Jul-17	10.11	59
## 12	David Benioff & D. B. Weiss	08-Apr-12	3.76	54
## 41	David Benioff & D. B. Weiss	12-Apr-15	8.00	53
## 42	David Benioff & D. B. Weiss	19-Apr-15	6.81	56
## 43	David Benioff & D. B. Weiss	26-Apr-15	6.71	60
## 51	David Benioff & D. B. Weiss	24-Apr-16	7.94	50
## 56	Bryan Cogman	29-May-16	6.71	52
## 58	David Benioff & D. B. Weiss	12-Jun-16	7.60	59
## 46	Bryan Cogman	17-May-15	6.24	54

## 69	Bryan Cogman	21-Apr-19	10.29	58
## 68	Dave Hill	14-Apr-19	11.76	54
## 70	David Benioff & D. B. Weiss	28-Apr-19	12.02	82
## 72	David Benioff & D. B. Weiss	12-May-19	12.40	78
## 71	David Benioff & D. B. Weiss	05-May-19	11.80	78
## 73	David Benioff & D. B. Weiss	19-May-19	13.61	80
##				
## 29				Robb and Catelyn arrive at the Twins for the v
## 48				Tyrion advises Daenerys. S
## 59				
## 60	Cersei and Loras Tyrell stand trial by the gods. Daenerys prepares to set sail for West			
## 64				
## 19				St.
## 32				Joffrey and Ma
## 36				Tyrion's trial has come
## 38	Theon helps Ramsay seize Moat Cailin. The wildlings attack Mole's Town. Sansa comes			
## 40				Jon makes an important decision. Daenerys exp
## 55	Sansa and Jon make plans. Arya is given another chance to prove herself. Jorah c			
## 9				Robb goes to war against the Lannisters. Jon finds himself struggling o
## 24				Jaime mopes over his l
## 39				
## 67				Everyone meets in King's Landing to discuss the
## 10				With Ned dead, Robb vows to get re
## 49				Jon and the wildlings return to Castle Black. Jaime r
## 52				Bran trains with the Three-Eyed Raven. Tommen meets with C
## 20				Joffrey puts Sansa aside for Margaery Tyr
## 7	Robert has been injured while hunting and is dying. Jon and the others finally take their v			
## 63				
## 6				While recovering from his battle with Jaime, Eddard is forc
## 30				Bran and company travel beyond the W
## 37				Tyrion tries to find a champion. Daenerys slee
## 54	Sansa arrives at Castle Black. Tyrion makes a deal with the slave masters. Jorah and			
## 66				
## 5	Catelyn has captured Tyrion and plans to bring him to her sister, Lysa Arryn, at the Val			
## 8				Eddard and his men are betrayed and captured by the Lannisters. When wo
## 16				Theon seizes control of Winterfell. Jon captures a wildling
## 28				Daenerys tries to persuade the Second S
## 31				Tyrion welcomes a guest to Kin
## 47	Jon heads east as trouble begins to stir for Sam and Gilly at Castle Black. Sansa as			
## 50				Stannis arrives at Winterfell. Tyrion runs Meereen as Daario and Jorah go after
## 1	Jon Arryn, the Hand of the King, is dead. King Robert Baratheon plans to ask his oldest frien			
## 17	Bran and Rickon have escaped Winterfell. Theon tries to hunt them down. Daenerys' dragons ha			
## 25				Robb's army is falling apart. Jaime reveal
## 62				Daenerys receives an unexpected visitor. Jon faces resis
## 65				Darnerys demands loyalty from the surviving Lann
## 11	Tyrion arrives at King's Landing to take his father's place as Hand of the King. Stannis Baratheon			
## 13				Tyrion tries to see who he can trust in the Small Council. C
## 14				Lord Baelish arrives at Renly's camp just before he faces off again
## 15				Tyrion investigates a secret weapon that King
## 18	Stannis is just days from King's Landing. Tyrion prepares for his arrival. Jon and C			
## 21				Jon is brought before Mance Rayder, the King Beyond th
## 23	Robb and Catelyn arrive at Riverrun for Lord Hoster Tully's funeral. Tywin nam			
## 26				Jon and the wildlings scale
## 33				Tyrion is arrested for the murder of Joffery and awaits trial.

34 Jaime entrusts a task to Brienne
 ## 2 While Bran
 ## 4
 ## 27 Jon and the wildlings travel south of the Wall. Talia
 ## 35 Tommen is crowned King of the
 ## 44 Jorah Mormont sets sail alongside his prisoner, Tyrion. Cersei makes a move ag
 ## 53 Daenerys arrives at Vaes Dothrak. Sam and Gilly sail for Horn Hill. Arya trains as No One. Vary
 ## 3
 ## 22 Bran and company meet Jojen and Meera Reed. Arya, Gendry, and
 ## 45 Daenerys arrests the heads of Meereen's great f
 ## 57 Jon and Sansa gather
 ## 61 Jon organizes the North's defenses. Cersei tries to even the
 ## 12 Arya makes friends with Gendry. Tyrion tries to take control of the Small Council
 ## 41 Cersei an
 ## 42 Arya arrives in Braavos. Jaime takes on a secret mission. Ellaria Sand seeks revenge for Ober
 ## 43 Tommen and Margaery wed. Arya has trouble adapting
 ## 51 The fate of Jon Snow is revealed. Daenerys is brought before Khal Moro. Tyrion gets use
 ## 56 Bran an
 ## 58 Brienne arrives at Riverrun. Arya seeks shelter. Jaime
 ## 46 Arya is put to the test. Tyrion
 ## 69
 ## 68 Jon and Daenerys arrive in Winterf
 ## 70
 ## 72
 ## 71
 ## 73
 ## IMDb_Rating Notable_Death_Count
 ## 29 9.9 8
 ## 48 9.9 4
 ## 59 9.9 4
 ## 60 9.9 11
 ## 64 9.8 0
 ## 19 9.7 2
 ## 32 9.7 3
 ## 36 9.7 0
 ## 38 9.7 6
 ## 40 9.7 4
 ## 55 9.7 5
 ## 9 9.6 2
 ## 24 9.6 5
 ## 39 9.6 10
 ## 67 9.6 1
 ## 10 9.5 3
 ## 49 9.5 2
 ## 52 9.5 4
 ## 20 9.4 6
 ## 7 9.3 2
 ## 63 9.3 2
 ## 6 9.2 4
 ## 30 9.2 1
 ## 37 9.2 4
 ## 54 9.2 8
 ## 66 9.2 3
 ## 5 9.1 5

## 8	9.1	7
## 16	9.1	5
## 28	9.1	3
## 31	9.1	2
## 47	9.1	2
## 50	9.1	7
## 1	9.0	4
## 17	9.0	5
## 25	9.0	4
## 62	9.0	2
## 65	9.0	2
## 11	8.9	2
## 13	8.9	2
## 14	8.9	4
## 15	8.9	4
## 18	8.9	3
## 21	8.9	0
## 23	8.9	1
## 26	8.9	1
## 33	8.9	4
## 34	8.9	1
## 2	8.8	3
## 4	8.8	1
## 27	8.8	0
## 35	8.8	3
## 44	8.8	3
## 53	8.8	5
## 3	8.7	0
## 22	8.7	1
## 45	8.7	1
## 57	8.7	1
## 61	8.7	2
## 12	8.6	1
## 41	8.6	2
## 42	8.6	3
## 43	8.6	5
## 51	8.6	4
## 56	8.5	0
## 58	8.4	4
## 46	8.1	1
## 69	7.9	0
## 68	7.6	1
## 70	7.5	7
## 72	6.0	7
## 71	5.5	2
## 73	4.1	1

a

From the data we know, the directors directed the five most highly rated episodes are:

1st: David Nutter 2nd-4th: Miguel Sapochnik 5th: Matt Shakman

b

```
df_got[order(df_got$IMDb_Rating),]
```

##	i..Season	Episode_Number	Number_in_Season
## 73	8	73	6
## 71	8	71	4
## 72	8	72	5
## 70	8	70	3
## 68	8	68	1
## 69	8	69	2
## 46	5	46	6
## 58	6	58	8
## 56	6	56	6
## 12	2	12	2
## 41	5	41	1
## 42	5	42	2
## 43	5	43	3
## 51	6	51	1
## 3	1	3	3
## 22	3	22	2
## 45	5	45	5
## 57	6	57	7
## 61	7	61	1
## 2	1	2	2
## 4	1	4	4
## 27	3	27	7
## 35	4	35	5
## 44	5	44	4
## 53	6	53	3
## 11	2	11	1
## 13	2	13	3
## 14	2	14	4
## 15	2	15	5
## 18	2	18	8
## 21	3	21	1
## 23	3	23	3
## 26	3	26	6
## 33	4	33	3
## 34	4	34	4
## 1	1	1	1
## 17	2	17	7
## 25	3	25	5
## 62	7	62	2
## 65	7	65	5
## 5	1	5	5
## 8	1	8	8
## 16	2	16	6
## 28	3	28	8
## 31	4	31	1
## 47	5	47	7
## 50	5	50	10
## 6	1	6	6

## 30	3	30	10
## 37	4	37	7
## 54	6	54	4
## 66	7	66	6
## 7	1	7	7
## 63	7	63	3
## 20	2	20	10
## 10	1	10	10
## 49	5	49	9
## 52	6	52	2
## 9	1	9	9
## 24	3	24	4
## 39	4	39	9
## 67	7	67	7
## 19	2	19	9
## 32	4	32	2
## 36	4	36	6
## 38	4	38	8
## 40	4	40	10
## 55	6	55	5
## 64	7	64	4
## 29	3	29	9
## 48	5	48	8
## 59	6	59	9
## 60	6	60	10
##		Episode_Name	Director
## 73		The Iron Throne	David Benioff & D. B. Weiss
## 71		The Last of the Starks	David Nutter
## 72		The Bells	Miguel Sapochnik
## 70		The Long Night	Miguel Sapochnik
## 68		Winterfell	David Nutter
## 69		A Knight of the Seven Kingdoms	David Nutter
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## 51		The Red Woman	Jeremy Podeswa
## 3		Lord Snow	Brian Kirk
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## 45		Kill the Boy	Jeremy Podeswa
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## 4		Cripples, Bastards, and Broken Things	Brian Kirk
## 27		The Bear and the Maiden Fair	Michelle MacLaren
## 35		First of His Name	Michelle MacLaren
## 44		Sons of the Harpy	Mark Mylod
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## 11		The North Remembers	Alan Taylor
## 13		What Is Dead May Never Die	Alik Sakharov
## 14		Garden of Bones	David Petrarca

## 15	The Ghost of Harrenhal	David Petrarca
## 18	The Prince of Winterfell	Alan Taylor
## 21	Valar Dohaeris	Daniel Minahan
## 23	Walk of Punishment	David Benioff
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## 33	Breaker of Chains	Alex Graves
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## 62	Stormborn	Mark Mylod
## 65	Eastwatch	Matt Shakman
## 5	The Wolf and the Lion	Brian Kirk
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## 37	Mockingbird	Alik Sakharov
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## 63	The Queen's Justice	Mark Mylod
## 20	Valar Morghulis	Alan Taylor
## 10	Fire and Blood	Alan Taylor
## 49	The Dance of Dragons	David Nutter
## 52	Home	Jeremy Podeswa
## 9	Baelor	Alan Taylor
## 24	And Now His Watch Is Ended	Alex Graves
## 39	The Watchers on the Wall	Neil Marshall
## 67	The Dragon and the Wolf	Jeremy Podeswa
## 19	Blackwater	Neil Marshall
## 32	The Lion and the Rose	Alex Graves
## 36	The Laws of Gods and Men	Alik Sakharov
## 38	The Mountain and the Viper	Alex Graves
## 40	The Children	Alex Graves
## 55	The Door	Jack Bender
## 64	The Spoils of War	Matt Shakman
## 29	The Rains of Castamere	David Nutter
## 48	Hardhome	Miguel Sapochnik
## 59	Battle of the Bastards	Miguel Sapochnik
## 60	The Winds of Winter	Miguel Sapochnik
##	Writer Original_Air_Date	US_Viewers Runtime
## 73	David Benioff & D. B. Weiss	19-May-19 13.61 80
## 71	David Benioff & D. B. Weiss	05-May-19 11.80 78
## 72	David Benioff & D. B. Weiss	12-May-19 12.40 78
## 70	David Benioff & D. B. Weiss	28-Apr-19 12.02 82
## 68	Dave Hill	14-Apr-19 11.76 54
## 69	Bryan Cogman	21-Apr-19 10.29 58
## 46	Bryan Cogman	17-May-15 6.24 54
## 58	David Benioff & D. B. Weiss	12-Jun-16 7.60 59

## 56	Bryan Cogman	29-May-16	6.71	52
## 12	David Benioff & D. B. Weiss	08-Apr-12	3.76	54
## 41	David Benioff & D. B. Weiss	12-Apr-15	8.00	53
## 42	David Benioff & D. B. Weiss	19-Apr-15	6.81	56
## 43	David Benioff & D. B. Weiss	26-Apr-15	6.71	60
## 51	David Benioff & D. B. Weiss	24-Apr-16	7.94	50
## 3	David Benioff & D. B. Weiss	01-May-11	2.44	58
## 22	Vanessa Taylor	07-Apr-13	4.27	56
## 45	Bryan Cogman	10-May-15	6.56	57
## 57	Bryan Cogman	05-Jun-16	7.80	51
## 61	David Benioff & D. B. Weiss	16-Jul-17	10.11	59
## 2	David Benioff & D. B. Weiss	24-Apr-11	2.20	56
## 4	Bryan Cogman	08-May-11	2.45	56
## 27	George R. R. Martin	12-May-13	4.84	58
## 35	David Benioff & D. B. Weiss	04-May-14	7.16	53
## 44	Dave Hill	03-May-15	6.82	51
## 53	David Benioff & D. B. Weiss	08-May-16	7.28	52
## 11	David Benioff & D. B. Weiss	01-Apr-12	3.86	53
## 13	Bryan Cogman	15-Apr-12	3.77	53
## 14	Vanessa Taylor	22-Apr-12	3.65	51
## 15	David Benioff & D. B. Weiss	29-Apr-12	3.90	55
## 18	David Benioff & D. B. Weiss	20-May-12	3.86	54
## 21	David Benioff & D. B. Weiss	31-Mar-13	4.37	55
## 23	David Benioff & D. B. Weiss	14-Apr-13	4.72	56
## 26	David Benioff & D. B. Weiss	05-May-13	5.50	53
## 33	David Benioff & D. B. Weiss	20-Apr-14	6.59	57
## 34	Bryan Cogman	27-Apr-14	6.95	55
## 1	David Benioff & D. B. Weiss	17-Apr-11	2.22	62
## 17	David Benioff & D. B. Weiss	13-May-12	3.69	56
## 25	Bryan Cogman	28-Apr-13	5.35	57
## 62	Bryan Cogman	23-Jul-17	9.27	59
## 65	Dave Hill	13-Aug-17	10.72	59
## 5	David Benioff & D. B. Weiss	15-May-11	2.58	55
## 8	George R. R. Martin	05-Jun-11	2.72	59
## 16	Vanessa Taylor	06-May-12	3.88	54
## 28	David Benioff & D. B. Weiss	19-May-13	5.13	56
## 31	David Benioff & D. B. Weiss	06-Apr-14	6.64	58
## 47	David Benioff & D. B. Weiss	24-May-15	5.40	59
## 50	David Benioff & D. B. Weiss	14-Jun-15	8.11	60
## 6	David Benioff & D. B. Weiss	22-May-11	2.44	53
## 30	David Benioff & D. B. Weiss	09-Jun-13	5.39	63
## 37	David Benioff & D. B. Weiss	18-May-14	7.20	51
## 54	David Benioff & D. B. Weiss	15-May-16	7.82	59
## 66	David Benioff & D. B. Weiss	20-Aug-17	10.24	70
## 7	David Benioff & D. B. Weiss	29-May-11	2.40	58
## 63	David Benioff & D. B. Weiss	30-Jul-17	9.25	63
## 20	David Benioff & D. B. Weiss	03-Jun-12	4.20	64
## 10	David Benioff & D. B. Weiss	19-Jun-11	3.04	53
## 49	David Benioff & D. B. Weiss	07-Jun-15	7.14	52
## 52	Dave Hill	01-May-16	7.29	54
## 9	David Benioff & D. B. Weiss	12-Jun-11	2.66	57
## 24	David Benioff & D. B. Weiss	21-Apr-13	4.87	53
## 39	David Benioff & D. B. Weiss	08-Jun-14	6.95	51
## 67	David Benioff & D. B. Weiss	27-Aug-17	12.07	80

## 19	George R. R. Martin	27-May-12	3.38	55
## 32	George R. R. Martin	13-Apr-14	6.31	52
## 36	Bryan Cogman	11-May-14	6.40	51
## 38	David Benioff & D. B. Weiss	01-Jun-14	7.17	52
## 40	David Benioff & D. B. Weiss	15-Jun-14	7.09	65
## 55	David Benioff & D. B. Weiss	22-May-16	7.89	57
## 64	David Benioff & D. B. Weiss	06-Aug-17	10.17	50
## 29	David Benioff & D. B. Weiss	02-Jun-13	5.22	51
## 48	David Benioff & D. B. Weiss	31-May-15	7.01	61
## 59	David Benioff & D. B. Weiss	19-Jun-16	7.66	60
## 60	David Benioff & D. B. Weiss	26-Jun-16	8.89	68
##				
## 73				
## 71				
## 72				
## 70				
## 68				Jon and Daenerys arrive in Winterfell.
## 69				
## 46				Arya is put to the test. Tyrion is arrested.
## 58				Brienne arrives at Riverrun. Arya seeks shelter. Jaime is arrested.
## 56				Bran and Rickon are taken to the Wall.
## 12				Arya makes friends with Gendry. Tyrion tries to take control of the Small Council.
## 41				Cersei and the Lannisters plot against the Starks.
## 42				Arya arrives in Braavos. Jaime takes on a secret mission. Ellaria Sand seeks revenge for Oberyn.
## 43				Tommen and Margaery wed. Arya has trouble adapting to life in Braavos.
## 51				The fate of Jon Snow is revealed. Daenerys is brought before Khal Moro. Tyrion gets used.
## 3				
## 22				Bran and company meet Jojen and Meera Reed. Arya, Gendry, and the Hound return.
## 45				Daenerys arrests the heads of Meereen's great families.
## 57				Jon and Sansa gather the North's lords.
## 61				Jon organizes the North's defenses. Cersei tries to even the odds.
## 2				While Bran is on the Wall, the Night King is active.
## 4				
## 27				Jon and the wildlings travel south of the Wall. Talia is captured.
## 35				Tommen is crowned King of the Seven Kingdoms.
## 44				Jorah Mormont sets sail alongside his prisoner, Tyrion. Cersei makes a move against the Starks.
## 53				Daenerys arrives at Vaes Dothrak. Sam and Gilly sail for Horn Hill. Arya trains as No One.
## 11				Tyrion arrives at King's Landing to take his father's place as Hand of the King. Stannis Baratheon is crowned.
## 13				Tyrion tries to see who he can trust in the Small Council. Cersei plots.
## 14				Lord Baelish arrives at Renly's camp just before he faces off against the Lannisters.
## 15				Tyrion investigates a secret weapon that King Stannis has.
## 18				Stannis is just days from King's Landing. Tyrion prepares for his arrival. Jon and the wildlings arrive.
## 21				Jon is brought before Mance Rayder, the King Beyond the Wall.
## 23				Robb and Catelyn arrive at Riverrun for Lord Hoster Tully's funeral. Tywin names Margaery.
## 26				Jon and the wildlings scale the Wall.
## 33				Tyrion is arrested for the murder of Joffery and awaits trial.
## 34				Jaime entrusts a task to Brienne.
## 1				Jon Arryn, the Hand of the King, is dead. King Robert Baratheon plans to ask his oldest friend.
## 17				Bran and Rickon have escaped Winterfell. Theon tries to hunt them down. Daenerys' dragons hatch.
## 25				Robb's army is falling apart. Jaime reveals his true colors.
## 62				Daenerys receives an unexpected visitor. Jon faces resistance.
## 65				Daenerys demands loyalty from the surviving Lannisters.
## 5				Catelyn has captured Tyrion and plans to bring him to her sister, Lysa Arryn, at the Vale.
## 8				Eddard and his men are betrayed and captured by the Lannisters. When word reaches the North,

16 Theon seizes control of Winterfell. Jon captures a wildling
 ## 28 Daenerys tries to persuade the Second S
 ## 31 Tyrion welcomes a guest to Kin
 ## 47 Jon heads east as trouble begins to stir for Sam and Gilly at Castle Black. Sansa as
 ## 50 Stannis arrives at Winterfell. Tyrion runs Meereen as Daario and Jorah go after
 ## 6 While recovering from his battle with Jaime, Eddard is forc
 ## 30 Bran and company travel beyond the W
 ## 37 Tyrion tries to find a champion. Daenerys sle
 ## 54 Sansa arrives at Castle Black. Tyrion makes a deal with the slave masters. Jorah and
 ## 66
 ## 7 Robert has been injured while hunting and is dying. Jon and the others finally take their v
 ## 63
 ## 20 Joffrey puts Sansa aside for Margaery Tyr
 ## 10 With Ned dead, Robb vows to get rev
 ## 49 Jon and the wildlings return to Castle Black. Jaime r
 ## 52 Bran trains with the Three-Eyed Raven. Tommen meets with C
 ## 9 Robb goes to war against the Lannisters. Jon finds himself struggling o
 ## 24 Jaime mopes over his l
 ## 39
 ## 67 Everyone meets in King's Landing to discuss the
 ## 19 St
 ## 32 Joffrey and M
 ## 36 Tyrion's trial has com
 ## 38 Theon helps Ramsay seize Moat Cailin. The wildlings attack Mole's Town. Sansa comes
 ## 40 Jon makes an important decision. Daenerys exp
 ## 55 Sansa and Jon make plans. Arya is given another chance to prove herself. Jorah c
 ## 64
 ## 29 Robb and Catelyn arrive at the Twins for the v
 ## 48 Tyrion advises Daenerys. S
 ## 59
 ## 60 Cersei and Loras Tyrell stand trial by the gods. Daenerys prepares to set sail for We
 ## IMDb_Rating Notable_Death_Count
 ## 73 4.1 1
 ## 71 5.5 2
 ## 72 6.0 7
 ## 70 7.5 7
 ## 68 7.6 1
 ## 69 7.9 0
 ## 46 8.1 1
 ## 58 8.4 4
 ## 56 8.5 0
 ## 12 8.6 1
 ## 41 8.6 2
 ## 42 8.6 3
 ## 43 8.6 5
 ## 51 8.6 4
 ## 3 8.7 0
 ## 22 8.7 1
 ## 45 8.7 1
 ## 57 8.7 1
 ## 61 8.7 2
 ## 2 8.8 3
 ## 4 8.8 1
 ## 27 8.8 0

## 35	8.8	3
## 44	8.8	3
## 53	8.8	5
## 11	8.9	2
## 13	8.9	2
## 14	8.9	4
## 15	8.9	4
## 18	8.9	3
## 21	8.9	0
## 23	8.9	1
## 26	8.9	1
## 33	8.9	4
## 34	8.9	1
## 1	9.0	4
## 17	9.0	5
## 25	9.0	4
## 62	9.0	2
## 65	9.0	2
## 5	9.1	5
## 8	9.1	7
## 16	9.1	5
## 28	9.1	3
## 31	9.1	2
## 47	9.1	2
## 50	9.1	7
## 6	9.2	4
## 30	9.2	1
## 37	9.2	4
## 54	9.2	8
## 66	9.2	3
## 7	9.3	2
## 63	9.3	2
## 20	9.4	6
## 10	9.5	3
## 49	9.5	2
## 52	9.5	4
## 9	9.6	2
## 24	9.6	5
## 39	9.6	10
## 67	9.6	1
## 19	9.7	2
## 32	9.7	3
## 36	9.7	0
## 38	9.7	6
## 40	9.7	4
## 55	9.7	5
## 64	9.8	0
## 29	9.9	8
## 48	9.9	4
## 59	9.9	4
## 60	9.9	11

From the data we know the name of the highest and lowest rated episodes are:

Highest: The Rains of Castamere Lowest: The Iron Throne

c

```
# we pair director and write column and order the data by IMDb_Rating
aggregate(df_got[, 11], list(df_got$Director,df_got$Writer), mean)
```

##	Group.1	Group.2	x
## 1	Alex Graves	Bryan Cogman	9.000000
## 2	Alik Sakharov	Bryan Cogman	9.300000
## 3	Brian Kirk	Bryan Cogman	8.800000
## 4	David Nutter	Bryan Cogman	7.900000
## 5	Jack Bender	Bryan Cogman	8.500000
## 6	Jeremy Podeswa	Bryan Cogman	8.400000
## 7	Mark Mylod	Bryan Cogman	8.850000
## 8	Michelle MacLaren	Bryan Cogman	8.900000
## 9	David Nutter	Dave Hill	7.600000
## 10	Jeremy Podeswa	Dave Hill	9.500000
## 11	Mark Mylod	Dave Hill	8.800000
## 12	Matt Shakman	Dave Hill	9.000000
## 13	Alan Taylor	David Benioff & D. B. Weiss	9.157143
## 14	Alex Graves	David Benioff & D. B. Weiss	9.475000
## 15	Alik Sakharov	David Benioff & D. B. Weiss	9.050000
## 16	Brian Kirk	David Benioff & D. B. Weiss	8.900000
## 17	D. B. Weiss	David Benioff & D. B. Weiss	9.100000
## 18	Daniel Minahan	David Benioff & D. B. Weiss	9.133333
## 19	Daniel Sackheim	David Benioff & D. B. Weiss	9.000000
## 20	David Benioff	David Benioff & D. B. Weiss	8.900000
## 21	David Benioff & D. B. Weiss	David Benioff & D. B. Weiss	4.100000
## 22	David Nutter	David Benioff & D. B. Weiss	8.700000
## 23	David Petrarca	David Benioff & D. B. Weiss	8.900000
## 24	Jack Bender	David Benioff & D. B. Weiss	9.700000
## 25	Jeremy Podeswa	David Benioff & D. B. Weiss	8.966667
## 26	Mark Mylod	David Benioff & D. B. Weiss	8.766667
## 27	Matt Shakman	David Benioff & D. B. Weiss	9.800000
## 28	Michael Slovis	David Benioff & D. B. Weiss	8.600000
## 29	Michelle MacLaren	David Benioff & D. B. Weiss	8.950000
## 30	Miguel Sapochnik	David Benioff & D. B. Weiss	8.716667
## 31	Neil Marshall	David Benioff & D. B. Weiss	9.600000
## 32	Tim Van Patten	David Benioff & D. B. Weiss	8.900000
## 33	Alex Graves	George R. R. Martin	9.700000
## 34	Daniel Minahan	George R. R. Martin	9.100000
## 35	Michelle MacLaren	George R. R. Martin	8.800000
## 36	Neil Marshall	George R. R. Martin	9.700000
## 37	Daniel Minahan	Vanessa Taylor	8.700000
## 38	David Nutter	Vanessa Taylor	9.100000
## 39	David Petrarca	Vanessa Taylor	8.900000

From the data we know the name of the highest and lowest writer director pairing are: Highest: Alex Graves & Bryan Cogman Lowest: David Petrarca & Vanessa Taylor

d

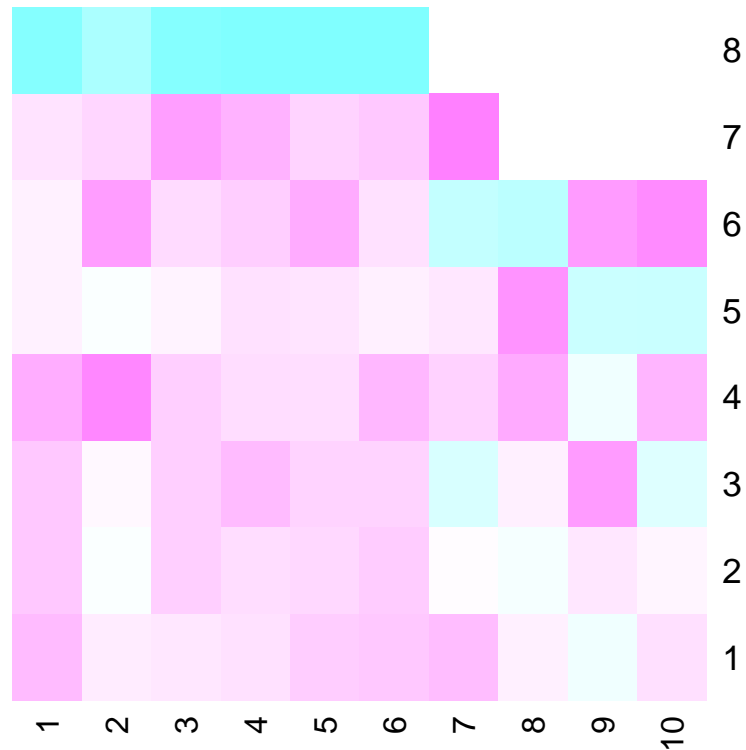
```
# inital empty matrix
m = matrix(, nrow = 8, ncol = 10)

# loop through the data and add to matrix
for (i in 1:nrow(df_got)){
  m[df_got[i,]$i..Season,df_got[i,]$Number_in_Season] = df_got[i,]$IMDb_Rating
}
print(m)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]
## [1,]  9.0  8.8  8.7  8.8  9.1  9.2  9.3  9.1  9.6   9.5
## [2,]  8.9  8.6  8.9  8.9  8.9  9.1  9.0  8.9  9.7   9.4
## [3,]  8.9  8.7  8.9  9.6  9.0  8.9  8.8  9.1  9.9   9.2
## [4,]  9.1  9.7  8.9  8.9  8.8  9.7  9.2  9.7  9.6   9.7
## [5,]  8.6  8.6  8.6  8.8  8.7  8.1  9.1  9.9  9.5   9.1
## [6,]  8.6  9.5  8.8  9.2  9.7  8.5  8.7  8.4  9.9   9.9
## [7,]  8.7  9.0  9.3  9.8  9.0  9.2  9.6  NA   NA    NA
## [8,]  7.6  7.9  7.5  5.5  6.0  4.1  NA   NA   NA    NA
```

e

```
# I have not solve question 3 when doing this, I use build-in function for partial marks. Blue stands f
m_heatmap <- heatmap(m, Rowv=NA, Colv=NA, col = cm.colors(256), scale="column")
```



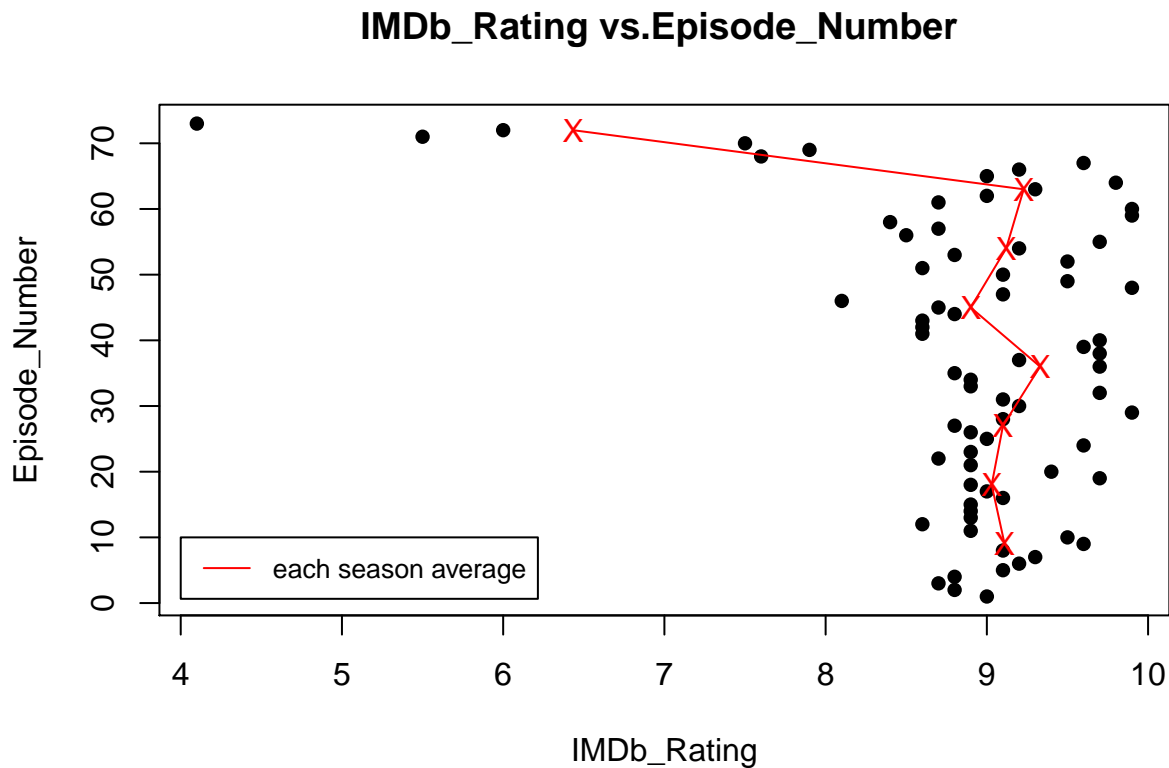
From the diagram we can know season 8 have the worst rating in general.

f

```
# plot from csv
plot(df_got$IMDb_Rating, df_got$Episode_Number, main="IMDb_Rating vs.Episode_Number ",
     xlab="IMDb_Rating", ylab="Episode_Number", pch=16)

# plot every season average
tempArr = aggregate(df_got[, 11], list(df_got$i..Season), mean)
xLast = 0
yLast = 0
for (i in 1:nrow(tempArr)){
  text(x = (tempArr[i,]$x), y = i*9, labels = "X" , col = "red")
  if (xLast == 0){
    # if we are plotting the first average, we do not draw line segments
  }else{
    # connect with red line segments
    segments(xLast, yLast, (tempArr[i,]$x), i*9,
             col = "red")
  }
  xLast = (tempArr[i,]$x)
  yLast = i*9
}
```

```
# add legend
legend(4, 10, legend=c("each season average"),
      col=c("red"), lty=1:2, cex=0.8)
```



From this graph we can see the whole show is every popular and have a good reputation except the final season.

g

We use `sc` function from question 2.

```
# input rating data
popRating <- df_got$IMDb_Rating
y <- df_got$Episode_Number

# set sc with absolute function from class
sc_pos = function(y.pop, y, attr, ...) {
  N <-length(y.pop)+1
  sapply( y,function(y.new) { abs(N*(attr(c(y.new, y.pop),...)- attr(y.pop,...))) } )
}

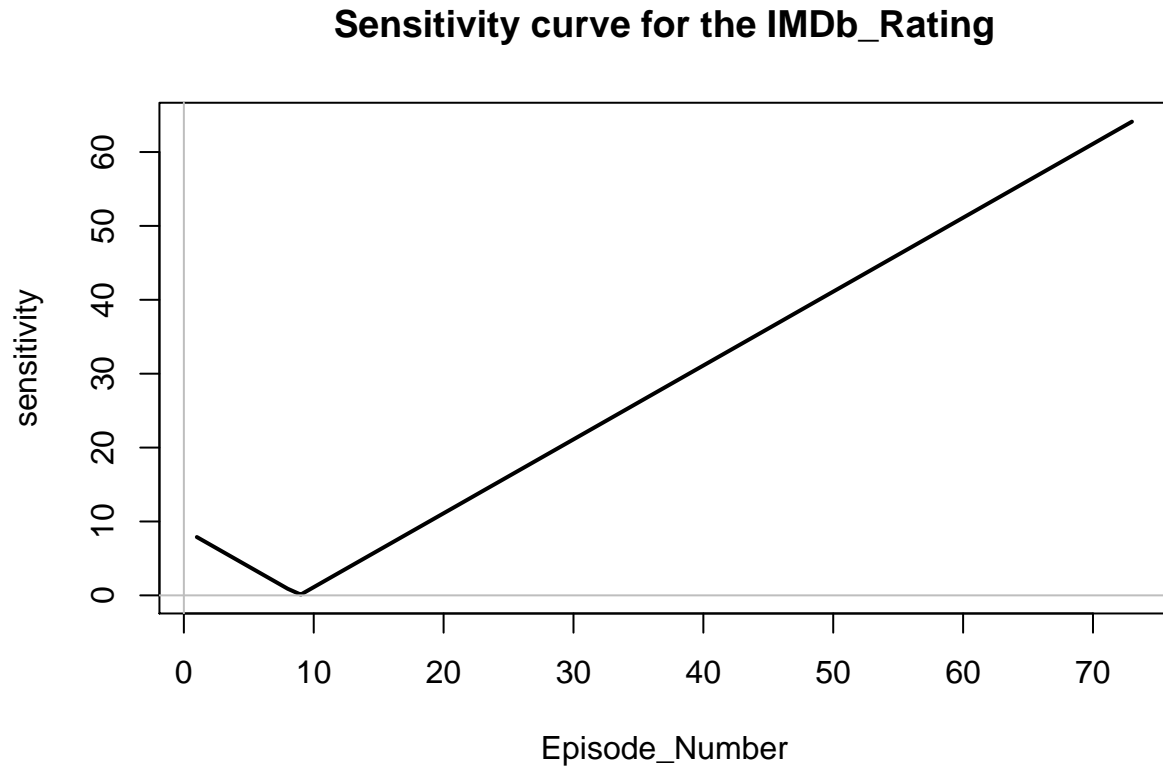
par(mfrow=c(1,1))

# plot the data
plot(y,sc_pos(popRating, y, mean), type="l", lwd = 2,
```

```

    main="Sensitivity curve for the IMDb_Rating",xlab="Episode_Number",ylab="sensitivity")
abline(h=0, v=0, col="grey")

```



The largest influence episode is the last episode. It is because it has the lowest mark.

h

We try 9 different alpha from 0 to 9.

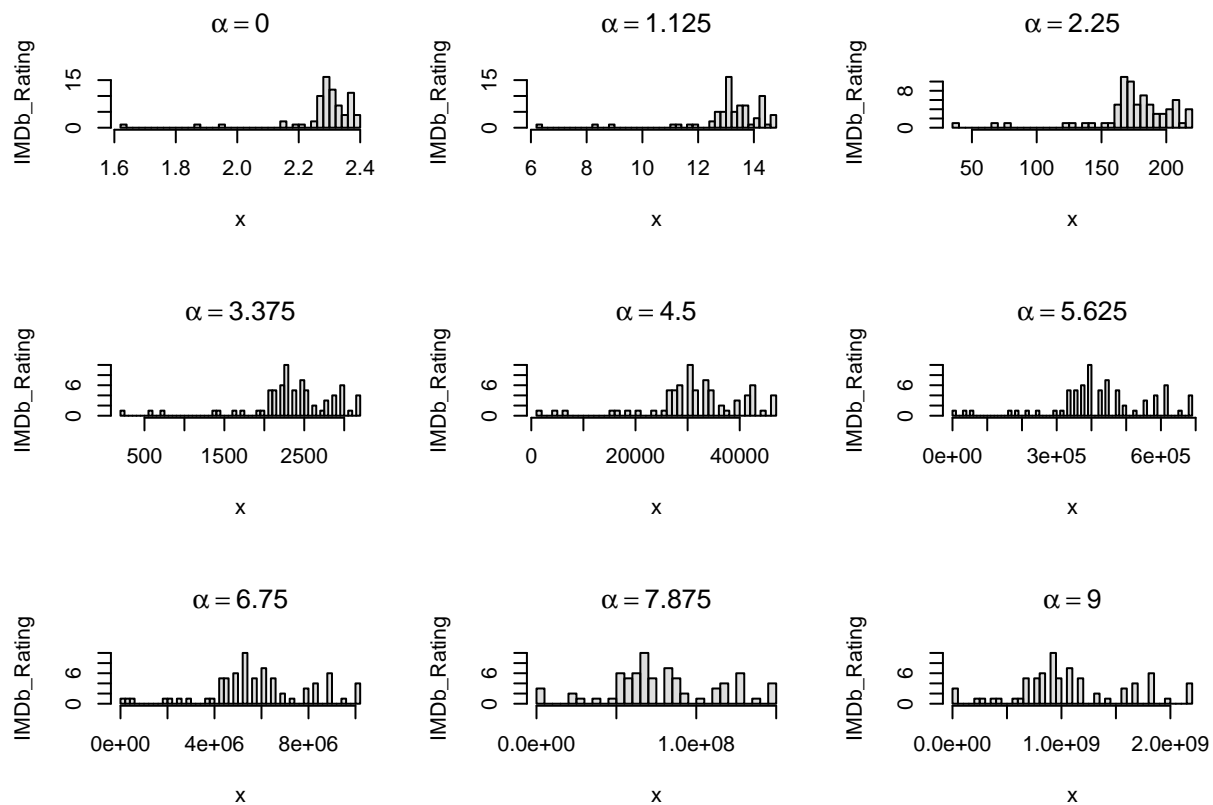
```

# input powerfun from class
powerfun <-function(x, alpha) {
  if(sum(x<=0)>0)stop("x must be positive")
  if(alpha==0)log(x)
  else if(alpha>0) {
    x^alpha
  }else -x^alpha
}

par(mfrow=c(3,3))
a =seq(0, 9, length.out=9)

for( i in 1:9 ) {
  hist(powerfun(df_got$IMDb_Rating+1, a[i]), col=adjustcolor("grey", alpha = 0.5),
    main=bquote(alpha==.(a[i])), xlab="x", ylab="IMDb_Rating",breaks=50)
}

```

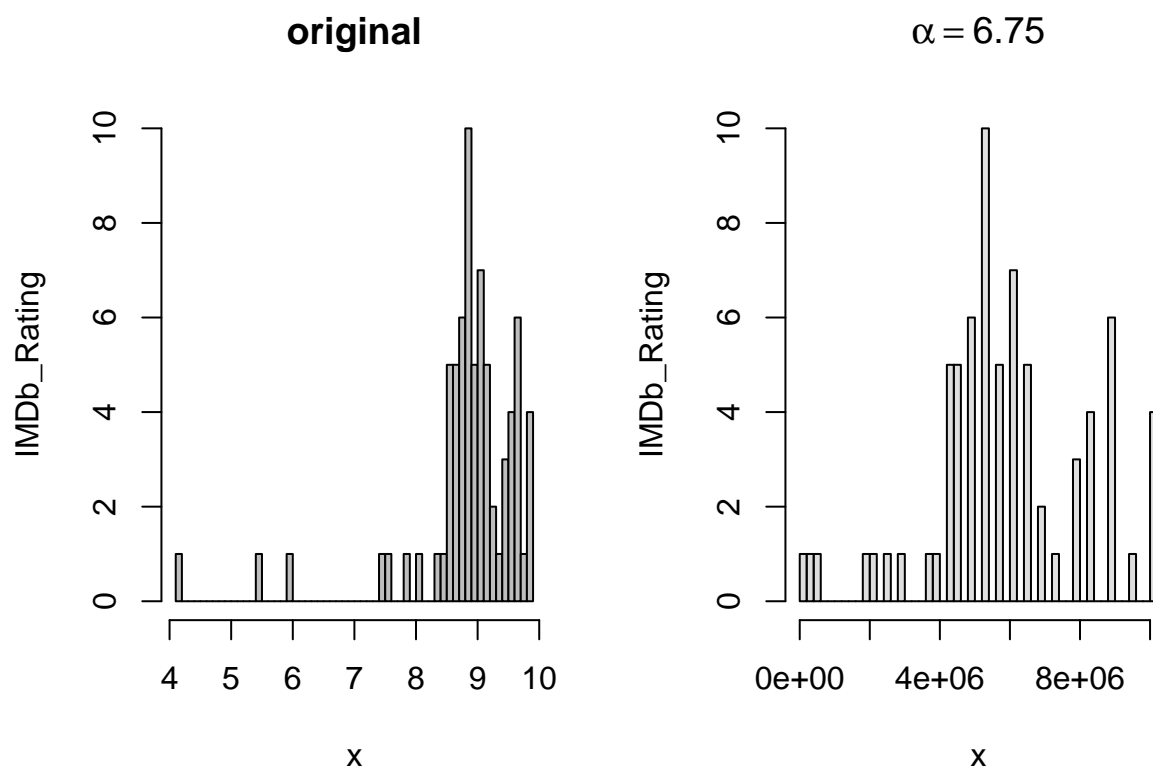


we have the best value of α as 6.75.

```
par(mfrow=c(1,2))
a =seq(0, 6.75, length.out=2)

hist(df_got$IMDb_Rating, col="grey",
     main=bquote("original"), xlab="x", ylab="IMDb_Rating",breaks=50)

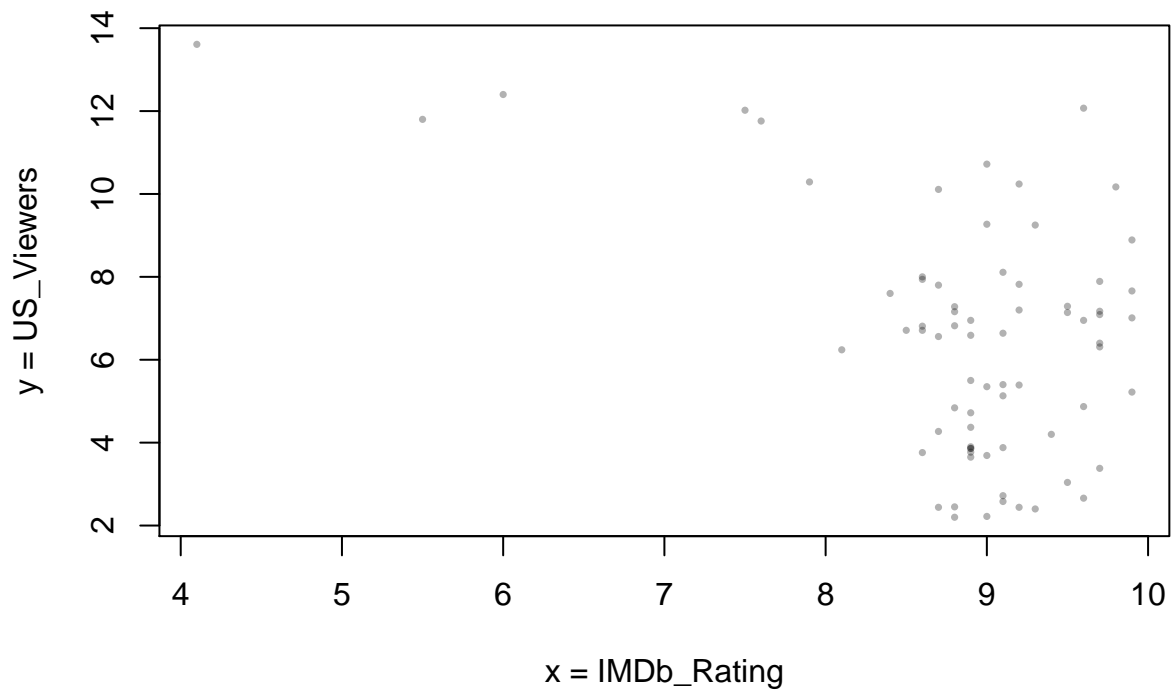
hist(powerfun(df_got$IMDb_Rating+1, a[2]), col=adjustcolor("grey", alpha = 0.5),
     main=bquote(alpha==.(a[2])), xlab="x", ylab="IMDb_Rating",breaks=50)
```



i

```
plot( df_got$IMDb_Rating, df_got$US_Viewers,
      pch = 16, cex=0.5,col=adjustcolor("black", alpha = 0.3),
      xlab = "x = IMDb_Rating", ylab = "y = US_Viewers",
      main = "Scatterplot IMDb_Rating vs. US_Viewers")
```

Scatterplot IMDb_Rating vs. US_Viewers



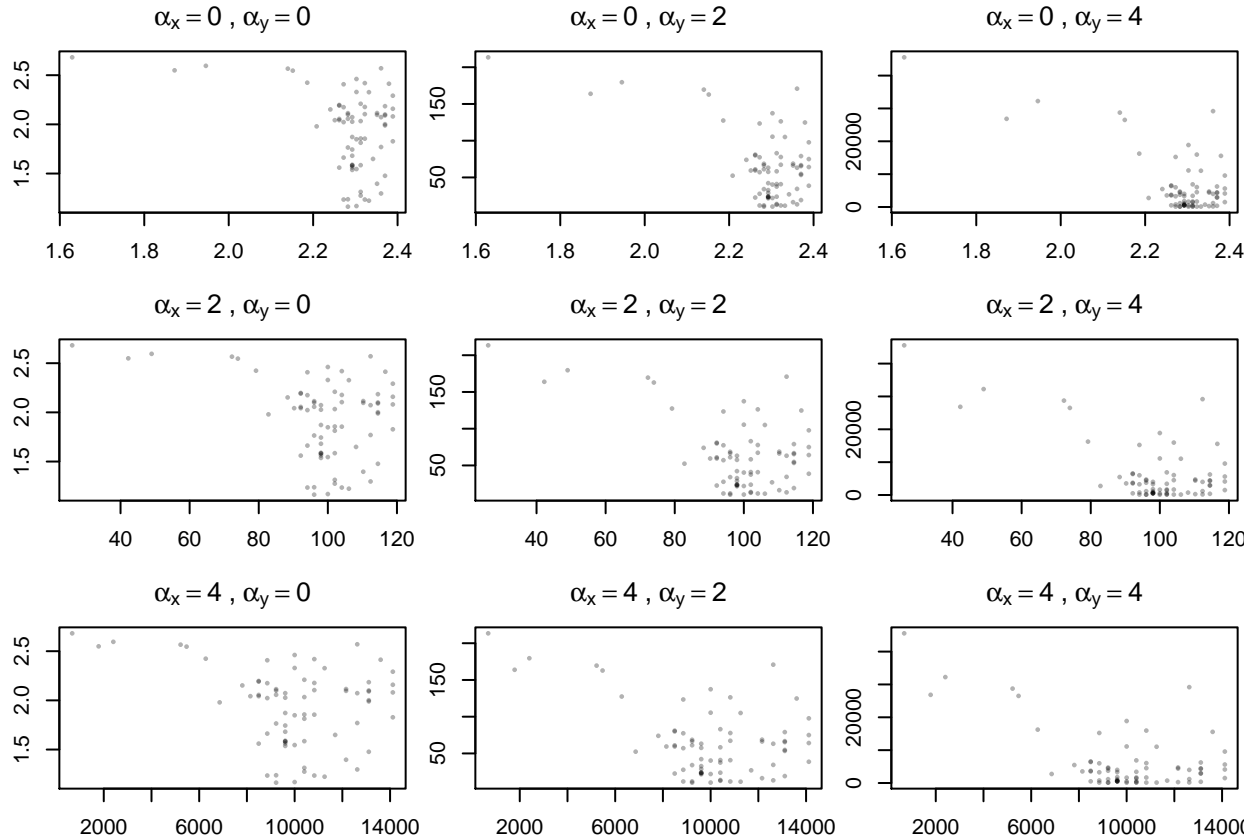
Since this is up on X and up on Y Consider both α and β larger than 0.

We try 9 different α and β from 0 to 4.

```
par(mfrow=c(3,3), mar=2.5*c(1,1,1,0.1))

a =rep(c(0,2,4),each=3)
b =rep(c(0,2,4),times=3)
subdata = df_got[,c('IMDb_Rating','US_Viewers')]
subdata =na.omit(subdata )

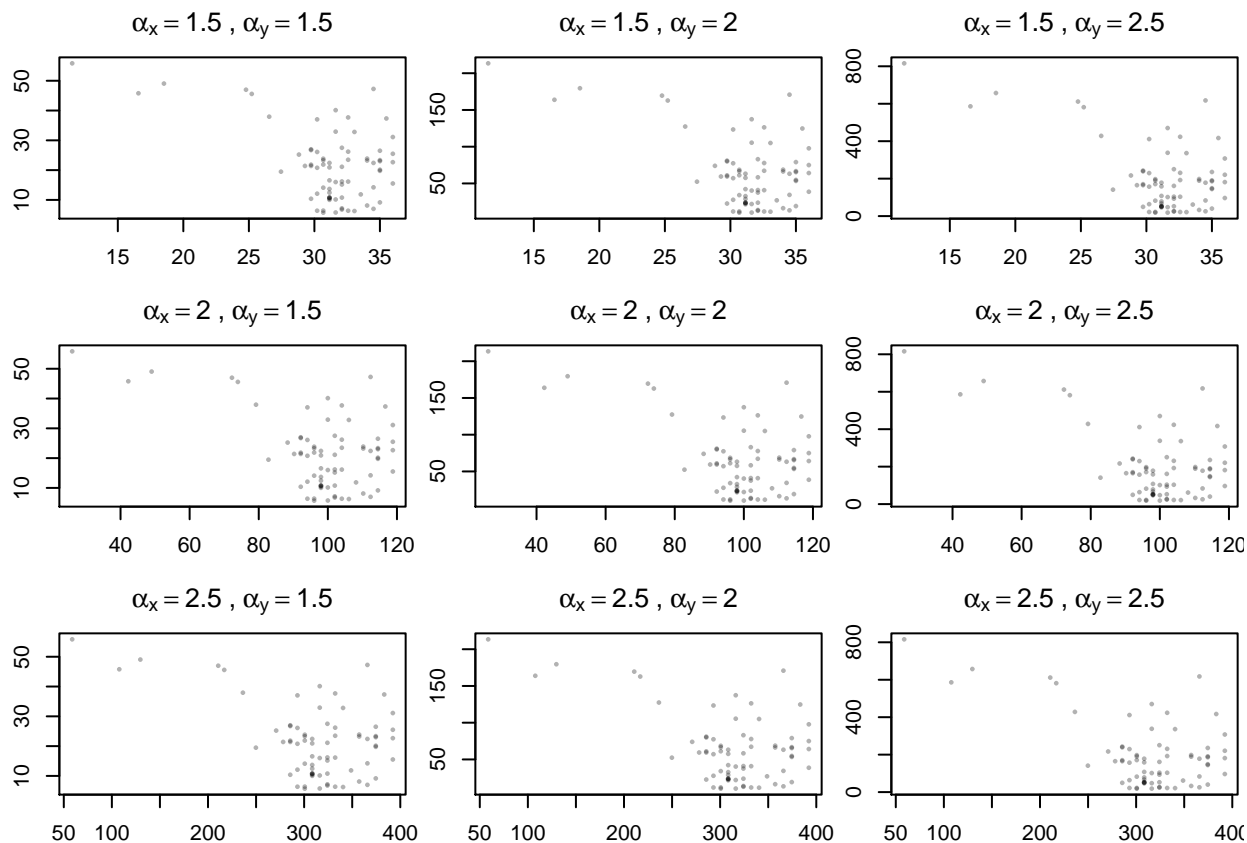
for(i in 1:9) {
  plot(powerfun(df_got$IMDb_Rating+1, a[i]),
        powerfun(df_got$US_Viewers+1, b[i]),
        pch = 16, cex=0.5,col=adjustcolor("black", alpha = 0.3),
        xlab = "", ylab = "",
        main = bquote(alpha[x]==.(a[i])~", "~alpha[y]==.(b[i])))
}
```



$a = 2$, $b = 2$ looks more linear, so we adjust the function more.

```
par(mfrow=c(3,3), mar=2.5*c(1,1,1,0.1))
a =rep(c(1.5,2,2.5),each=3)
b =rep(c(1.5,2,2.5),times=3)
subdata = df_got[,c('IMDb_Rating','US_Viewers')]
subdata =na.omit(subdata )

for(i in 1:9) {
  plot(powerfun(df_got$IMDb_Rating+1, a[i]),
        powerfun(df_got$US_Viewers+1, b[i]),
        pch = 16, cex=0.5,col=adjustcolor("black", alpha = 0.3),
        xlab = "IMDb_Rating", ylab = "US_Viewers",
        main = bquote(alpha[x]==.(a[i])~", "~alpha[y]==.(b[i])))
}
```

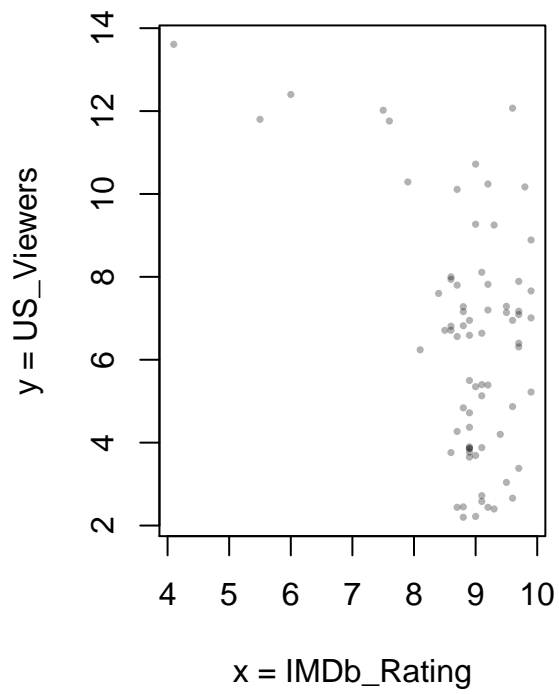
```
par(mfrow=c(1,2))
a =seq(0, 6.75, length.out=2)

plot( df_got$IMDb_Rating, df_got$US_Viewers,
      pch = 16, cex=0.5,col=adjustcolor("black", alpha = 0.3),
      xlab = "x = IMDb_Rating", ylab = "y = US_Viewers",
      main = "Scatterplot IMDb_Rating vs. US_Viewers")

a =rep(c(2),each=1)
b =rep(c(2.5),times=1)
subdata = df_got[,c('IMDb_Rating','US_Viewers')]
subdata =na.omit(subdata )

plot(powerfun(df_got$IMDb_Rating+1, a[1]),
     powerfun(df_got$US_Viewers+1, b[1]),
     pch = 16, cex=0.5,col=adjustcolor("black", alpha = 0.3),
     xlab = "x = IMDb_Rating", ylab = "y = US_Viewers",
     main = bquote(alpha[x]==.(a[1])~", "~alpha[y]==.(b[1])))
```

Scatterplot IMDb_Rating vs. US_Vie



$$\alpha_x = 2, \alpha_y = 2.5$$

