

# RWorksheet#5\_Group(Cahutay, Camarista, Josue)

Cahutay, Camarista, Josue

2024-12-10

```
library(polite)
library(httr)
library(rvest)
```

```
## Warning: package 'rvest' was built under R version 4.4.2
```

```
library(dplyr)
```

```
##
```

```
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
```

```
##
```

```
##      filter, lag
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
##      intersect, setdiff, setequal, union
```

```
url <- "https://www.imdb.com/chart/toptv/?sort=rank%2Casc"
```

```
session <- bow(url,
               user_agent = "Educational")
```

```
session
```

```
## <polite session> https://www.imdb.com/chart/toptv/?sort=rank%2Casc
```

```
##      User-agent: Educational
```

```
##      robots.txt: 35 rules are defined for 3 bots
```

```
##      Crawl delay: 5 sec
```

```
##      The path is scrapable for this user-agent
```

## 1. Extracting TV Shows

```
#Extracting the ranks and titles
```

```
title_list <- read_html(url) %>%
  html_nodes('.ipc-title__text') %>%
  html_text()
```

```

#Cleaning extracted text
title_list_sub <- as.data.frame(title_list[3:27], stringsAsFactors = FALSE)
colnames(title_list_sub) <- "ranks"

split_df <- strsplit(as.character(title_list_sub$ranks), "\\.", fixed = FALSE)
split_df <- data.frame(do.call(rbind, split_df), stringsAsFactors = FALSE)

colnames(split_df) <- c("rank", "title")
split_df <- split_df %>% select(rank, title)

split_df$title <- trimws(split_df$title)

rank_title <- split_df
rank_title

```

```

##      rank      title
## 1      1  Breaking Bad
## 2      2  Planet Earth II
## 3      3  Planet Earth
## 4      4  Band of Brothers
## 5      5  Chernobyl
## 6      6  The Wire
## 7      7  Avatar: The Last Airbender
## 8      8  Blue Planet II
## 9      9  The Sopranos
## 10     10  Cosmos: A Spacetime Odyssey
## 11     11  Cosmos
## 12     12  Our Planet
## 13     13  Game of Thrones
## 14     14  Bluey
## 15     15  The World at War
## 16     16  Fullmetal Alchemist Brotherhood
## 17     17  Rick and Morty
## 18     18  Life
## 19     19  The Last Dance
## 20     20  The Twilight Zone
## 21     21  The Vietnam War
## 22     22  Sherlock
## 23     23  Attack on Titan
## 24     24  Batman: The Animated Series
## 25     25  Arcane

```

```

#Extracting tv rating, the number of people who voted, the number of episodes, and the year it was released
rating_ls <- read_html(url) %>%
  html_nodes('.ipc-rating-star--rating') %>%
  html_text()

voter_ls <- read_html(url) %>%
  html_nodes('.ipc-rating-star--voteCount') %>%
  html_text()

clean_votes <- gsub('[(\)]', '', voter_ls)

#extracted the number of episodes

```

```

eps_ls <- read_html(url) %>%
  html_nodes('span.sc-300a8231-7.eaXxft.cli-title-metadata-item:nth-of-type(2)') %>%
  html_text()
clean_eps <- gsub('[eps]', '', eps_ls)
num_eps <- as.numeric(clean_eps)
#note to self, use gsub() to remove constant strings appearing in the dataset.

#extracted the year released
years <- read_html(url) %>%
  html_nodes('span.sc-300a8231-7.eaXxft.cli-title-metadata-item:nth-of-type(1)') %>%
  html_text()

```

```

top_tv_shows <- data.frame(
  Rank = rank_title[,1],
  Title = rank_title[,2],
  Rating = rating_ls,
  Voters = clean_votes,
  Episodes = num_eps,
  Year = years
)
top_tv_shows

```

##	Rank	Title	Rating	Voters	Episodes	Year
## 1	1	Breaking Bad	9.5	2.2M	62	2008-2013
## 2	2	Planet Earth II	9.5	163K	6	2016
## 3	3	Planet Earth	9.4	224K	11	2006
## 4	4	Band of Brothers	9.4	547K	10	2001
## 5	5	Chernobyl	9.3	912K	5	2019
## 6	6	The Wire	9.3	392K	60	2002-2008
## 7	7	Avatar: The Last Airbender	9.3	392K	62	2005-2008
## 8	8	Blue Planet II	9.3	49K	7	2017
## 9	9	The Sopranos	9.2	502K	86	1999-2007
## 10	10	Cosmos: A Spacetime Odyssey	9.2	132K	13	2014
## 11	11	Cosmos	9.3	46K	13	1980
## 12	12	Our Planet	9.2	54K	12	2019-2023
## 13	13	Game of Thrones	9.2	2.4M	74	2011-2019
## 14	14	Bluey	9.3	34K	194	2018-
## 15	15	The World at War	9.2	32K	26	1973-1974
## 16	16	Fullmetal Alchemist Brotherhood	9.1	210K	68	2009-2010
## 17	17	Rick and Morty	9.1	630K	78	2013-
## 18	18	Life	9.1	44K	11	2009
## 19	19	The Last Dance	9.0	161K	10	2020
## 20	20	The Twilight Zone	9.0	98K	156	1959-1964
## 21	21	The Vietnam War	9.1	30K	10	2017
## 22	22	Sherlock	9.1	1M	15	2010-2017
## 23	23	Attack on Titan	9.1	568K	98	2013-2023
## 24	24	Batman: The Animated Series	9.0	123K	85	1992-1995
## 25	25	Arcane	9.1	344K	18	2021-2024

*#displays the data frame of top tv shows, with their Rank, Title, Rating, Number of Voters, Episodes, a*

Number of user reviews

```

home_link <- 'https://www.imdb.com/chart/toptv/'
main_page <- read_html(home_link)

links <- main_page %>%
  html_nodes("a.ipc-title-link-wrapper") %>%
  html_attr("href")

# Loop to get link of each show's page
show_data <- lapply(links, function(link) {
  complete_link <- paste0("https://imdb.com", link)

  #loop to get the link for user review page
  usrv_link <- read_html(complete_link)
  usrv_link_page <- usrv_link %>%
    html_nodes('a.isReview') %>%
    html_attr("href")

  #loop to get user reviews of each shows
  usrv <- read_html(paste0("https://imdb.com", usrv_link_page[1]))
  usrv_count <- usrv %>%
    html_nodes('[data-testid="tturv-total-reviews"]') %>%
    html_text()

  #loop to extract critic reviews
  critic <- usrv_link %>%
    html_nodes("span.score") %>%
    html_text()
  critic_df <- data.frame(Critic_Reviews = critic[2], stringsAsFactors = FALSE)

  #loop to extract pop rating
  pop_rating <- usrv_link %>%
    html_nodes('[data-testid="hero-rating-bar__popularity__score"]') %>%
    html_text()
  pop_rating_df <- data.frame(Popularity_Rating = pop_rating[2], stringsAsFactors = FALSE)

  return(data.frame(User_Reviews = usrv_count, Critic = critic_df, pop = pop_rating_df))
})

show_url_df <- do.call(rbind, show_data)
shows <- cbind(top_tv_shows, show_url_df)
shows

```

##	Rank	Title	Rating	Voters	Episodes	Year
## 1	1	Breaking Bad	9.5	2.2M	62	2008-2013
## 2	2	Planet Earth II	9.5	163K	6	2016
## 3	3	Planet Earth	9.4	224K	11	2006
## 4	4	Band of Brothers	9.4	547K	10	2001
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## 8	8	Blue Planet II	9.3	49K	7	2017
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## 19	19	The Last Dance	9.0	161K	10	2020
## 20	20	The Twilight Zone	9.0	98K	156	1959-1964
## 21	21	The Vietnam War	9.1	30K	10	2017
## 22	22	Sherlock	9.1	1M	15	2010-2017
## 23	23	Attack on Titan	9.1	568K	98	2013-2023
## 24	24	Batman: The Animated Series	9.0	123K	85	1992-1995
## 25	25	Arcane	9.1	344K	18	2021-2024
##		User_Reviews	Critic_Reviews	Popularity_Rating		
## 1	5,118 reviews	176	24			
## 2	158 reviews	6	1,082			
## 3	111 reviews	10	2,066			
## 4	1,059 reviews	34	173			
## 5	3,538 reviews	88	146			
## 6	787 reviews	77	112			
## 7	1,001 reviews	57	327			
## 8	53 reviews	9	4,399			
## 9	968 reviews	93	26			
## 10	205 reviews	12	1,457			
## 11	80 reviews	8	3,902			
## 12	245 reviews	15	2,798			
## 13	5,913 reviews	368	16			
## 14	369 reviews	4	368			
## 15	126 reviews	5	2,290			
## 16	468 reviews	16	505			
## 17	911 reviews	94	126			
## 18	12 reviews	9	3,107			
## 19	542 reviews	28	1,593			
## 20	214 reviews	85	366			
## 21	175 reviews	13	1,841			
## 22	1,098 reviews	121	172			
## 23	2,377 reviews	65	52			
## 24	219 reviews	25	518			
## 25	2,278 reviews	59	2			

*#shows df with user reviews, critic reviews, and popularity ratings.*

2. 5 tv shows to scrape 20 user reviews.

```
#links of the 5 shows I want to scrape
#breaking bad, planet earth 2, band of brothers, chernobyl, game of thrones
library(rvest)
library(dplyr)

url_of_5Shows <- c(
  "https://www.imdb.com/title/tt0903747/reviews/?ref_=ttexr_ql_2",
```

```

"https://www.imdb.com/title/tt5491994/reviews/?ref_=tt_ov_ql_2",
"https://www.imdb.com/title/tt0185906/reviews/?ref_=tt_ov_ql_2",
"https://www.imdb.com/title/tt7366338/reviews/?ref_=tt_ov_ql_2",
"https://www.imdb.com/title/tt0944947/reviews/?ref_=tt_ov_ql_2"
)

five_shows_url_df <- data.frame(
  Title = c(
    "Breaking Bad",
    "Planet Earth II",
    "Band of Brothers",
    "Chernobyl",
    "Game of Thrones"
  ),
  URLs = url_of_5Shows
)

#function for scraping reviews
scrape_reviews <- function(show_url) {
  page <- read_html(show_url)

  # scrape usernames
  usernames <- page %>%
    html_nodes('[data-testid="author-link"]') %>%
    html_text()

  # scrape review dates
  review_dates <- page %>%
    html_nodes('li.review-date') %>%
    html_text()

  #scrape user rating
  user_rating <- page %>%
    html_nodes('span.ipc-rating-star--rating') %>%
    html_text()

  #scrape user's review title
  rev_title <- page %>%
    html_nodes('h3.ipc-title__text') %>%
    html_text()

  #scrape user text reviews
  text_rev <- page %>%
    html_nodes('div.ipc-html-content-inner-div') %>%
    html_text()

  #two codeblocks below are still being fixed
  #scrape helpful reviews
  helpful_rev <- page %>%
    html_nodes('div.ipc-list-card__actions') %>%
    html_text()

  #scrape not helpful reviews

```

```

not_helpful <- page %>%
  html_nodes('span.count--down') %>%
  html_text()

data.frame(
  Usernames = head(usernames, 20),
  Dates = head(review_dates, 20),
  User_Rating = head(user_rating, 20),
  Review_Title = head(rev_title, 20),
  Text_Reviews = head(text_rev, 20)
)
}

reviews_data <- lapply(five_shows_url_df$URLs, scrape_reviews)
names(reviews_data) <- five_shows_url_df$Title
reviews_data[["Breaking Bad"]]

```

```

##           Usernames      Dates User_Rating
## 1         FiRE010   Jul 3, 2021          10
## 2       bruhperson   Mar 6, 2019          10
## 3     KinoKoopasKid   Jul 29, 2021          10
## 4       jehuschultz   Feb 18, 2020          10
## 5     Supermanfan-13   Nov 8, 2021          10
## 6 manishsingh-03299   May 30, 2019          10
## 7         Rob1331    Dec 8, 2022          10
## 8         xpinerhd   Nov 15, 2019          10
## 9 dhanushreddy-14919   Jul 17, 2021          10
## 10        tushv-31482   Dec 8, 2022          10
## 11         dyarutd   Sep 28, 2024           7
## 12       reebokroot   Feb 14, 2021           2
## 13    uk_steve_smith   Aug 13, 2015          10
## 14 TheLittleSongbird   Nov 12, 2017          10
## 15        gogoschka-1   Jan 11, 2014          10
## 16        FishDrowned   Nov 8, 2021          10
## 17        joegalgano   Aug 11, 2021          10
## 18        agatt-87232   May 19, 2019          10
## 19    Leofwine_draca   May 4, 2021          10
## 20    dristysultana   Jun 23, 2021          10

```

```

##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9
## 10
## 11
## 12
## 13
## 14

```

Those days a

Once  
My Review For

Among the best and most a

```

## 15 If you mix Scarface, Robin Hood and maybe Tyler Durden with enough meth - you'll get a mean cockt
## 16 By far the greatest
## 17 in a c
## 18 Since GOT is over, this is Officially the C
## 19 Every bit a
## 20
##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9
## 10
## 11
## 12
## 13
## 14 'Breaking Bad' is one of the most popular rated shows on IMDb, is one of those rarities where ever
## 15
## 16
## 17
## 18
## 19
## 20

```

```
reviews_data[["Planet Earth II"]]
```

```

##          Usernames      Dates User_Rating
## 1      arjanhylvkema Nov 7, 2016          10
## 2          Wentloog Nov 5, 2016          10
## 3    john-m-madsen Nov 5, 2016          10
## 4    thespookybuzz Nov 9, 2016          10
## 5      pjdickinson Nov 5, 2016          10
## 6         dbijis33 Nov 8, 2016          10
## 7    dhanrajjughead Nov 17, 2016          10
## 8      NeilBarnett Nov 13, 2016          10
## 9    salmanu-27386 Nov 6, 2016          10
## 10 panagiotiskatsanos Dec 31, 2016          10
## 11          ianrobo Nov 19, 2016          10
## 12      adamonIMDb Dec 28, 2016           7
## 13      tinyfordst May 19, 2019          10
## 14    larask-21775 Oct 20, 2018          10
## 15      BobFillmore Sep 29, 2017          10
## 16    farshidkarimi Nov 22, 2016          10
## 17 TheLittleSongbird Oct 12, 2017          10
## 18    myersei-165-4350 Dec 4, 2016          10
## 19    fierceeeagle-40009 Apr 23, 2020          10
## 20      adam-whitmore Jan 5, 2017          10
##
## 1
## 2

```

At once awe-inspiring a



```

## 3 Yet another masterpiece from BBC Nature & David Attenborough
## 4
## 5
## 6 Dangerously beautiful
## 7 Greatest documentary ever made
## 8 Best thing on TV since last century
## 9
## 10 One of the best documentaries I have ever seen
## 11 In times of climate change
## 12
## 13 More irritated with IMDb for the bias than the documentary
## 14
## 15 Should be required viewing for all
## 16 What a Beautiful Planet
## 17 Like the first 'Planet Earth', does for nature and our planet as 'Walking with Dinosaurs' did with dinosaurs
## 18 This masterpiece deserves a 10
## 19 Absolutely brilliant
## 20 Peerless evocation of nature and the planet
##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9
## 10
## 11
## 12
## 13
## 14
## 15
## 16
## 17 Absolutely adore the first 'Planet Earth' from 2007, one of the best documentaries ever made and
## 18
## 19
## 20

```

```
reviews_data[["Band of Brothers"]]
```

##	Username	Date	User_Rating
## 1	Rob1331	Sep 27, 2022	10
## 2	sanderson777	Oct 14, 2001	10
## 3	wildcatt268	Jan 18, 2002	10
## 4	arjay24	Apr 18, 2004	10
## 5	rbverhoef	Feb 13, 2003	10
## 6	yodaschoda	Jan 23, 2005	10
## 7	philip_vanderveken	Sep 16, 2004	10
## 8	Supermanfan-13	May 6, 2022	10
## 9	thiagoutp	Nov 4, 2019	10
## 10	bsmith5552	Nov 5, 2001	10
## 11	faded_english_monkey	Aug 25, 2004	10

## 12	planktonrules	May 30, 2015	7
## 13	stilonkostrzyn	Apr 10, 2021	5
## 14	faded_Glory	May 2, 2006	10
## 15	jazmodo	Jun 3, 2019	10
## 16	kait2007	Jan 26, 2005	10
## 17	mickman91-1	May 3, 2022	10
## 18	kipmcmillan	Oct 24, 2018	9
## 19	erwan_ticheler	Dec 7, 2002	10
## 20	grahamsj3	Nov 25, 2002	10

##	Review_Title
## 1	Incredible!!
## 2	Possibly the finest 10 hours ever created
## 3	One of the best war movies/series ever
## 4	Realistic
## 5	Excellent
## 6	One of, if not the best, mini series' ever made
## 7	This series is so unbelievably realistic, so authentic.
## 8	One of the best mini-series ever created!
## 9	Probably the best ever
## 10	Realistic WWII Drama With Warts Included
## 11	war, no frills
## 12	You can't beat this....
## 13	Overrated??
## 14	Not very realistic at all
## 15	Without Doubt, the Best Mini-Series Ever Recorded
## 16	Great Miniseries
## 17	A series like this won't be made again (see below), so treasure it
## 18	Share With Your Children
## 19	Best Mini series ever
## 20	A-1, TOPS, the BOMB what else can I say?

## 1

## 2

## 3

## 4

## 5

## 6

## 7

## 8

## 9

## 10

## 11

## 12

## 13

## 14 Lots of people applaud this series for its realism, but I can't really agree. I think there is st.

## 15

## 16

## 17

## 18

## 19

## 20

```
reviews_data[["Chernobyl"]]
```

##		Username	Date	User_Rating
## 1	curiosityonmars	May 23, 2019	10	
## 2	stelmakh	May 10, 2019	10	
## 3	natashapekar	May 9, 2019	10	
## 4	m-porpaczi	May 14, 2019	10	
## 5	Lladerat	May 7, 2019	10	
## 6	jfirebug	May 20, 2019	10	
## 7	thegldt	May 6, 2019	10	
## 8	alexander-phoenix	May 13, 2019	10	
## 9	wmeduardowm	May 6, 2019	10	
## 10	Leofwine_draca	Nov 27, 2019	10	
## 11	Jamie_Seaton	May 23, 2019	5	
## 12	tutajdaniel	Jun 15, 2019	8	
## 13	frimark	May 20, 2019	10	
## 14	krzysztof-18241	May 30, 2019	10	
## 15	ahmetkozan	Jun 7, 2019	9	
## 16	Rob1331	Sep 27, 2022	10	
## 17	stephenpdodds	May 6, 2019	9	
## 18	Supermanfan-13	Jul 10, 2022	9	
## 19	emholberg	May 26, 2019	10	
## 20	josephwhitton	May 15, 2019	7	

##		Review_Title
## 1		They got it right
## 2		Goosebumps and tears
## 3		I highly recommend this film!
## 4		No hero wakes up wanting to die
## 5		So far looks excellent
## 6		Incredible
## 7		Bleak, Unsettling, Haunting All Throughout
## 8		Unbelievable
## 9		HBO did it again!
## 10		Exemplary
## 11		Amazing!
## 12	The movie is far from thuth. A lot of fake info to create a drama...	
## 13		Emotionally drained...
## 14		Just watch it (!)
## 15		Now you look like the minister of coal!
## 16		Must Watch!
## 17		Cracking.
## 18		Brilliant!
## 19	It is hard to overestimate the importance of this show.	
## 20		Amazing

##	
## 1	
## 2	
## 3	
## 4	As my mother tells it, the weather was quite nice, the sky was clear without any sign of clouds in
## 5	
## 6	
## 7	
## 8	
## 9	
## 10	
## 11	

```
## 12
## 13
## 14
## 15
## 16
## 17
## 18
## 19
## 20
```

```
reviews_data[["Game of Thrones"]]
```

##	Username	Date	User_Rating	Review_Title
## 1	danielkpkp	May 11, 2020	9	
## 2	samxxx-671-826221	May 24, 2019	8	
## 3	slowcando	May 20, 2019	8	
## 4	SaifOVGU	Apr 8, 2020	10	
## 5	jacobnoble-02524	May 9, 2019	9	
## 6	Dan_W_Reviews	Feb 5, 2023	9	
## 7	heavenacceptme	Aug 22, 2022	10	
## 8	Supermanfan-13	Dec 9, 2023	10	
## 9	tweaknhoe	May 25, 2019	8	
## 10	TheLittleSongbird	Nov 8, 2017	10	
## 11	kunkell	Nov 1, 2019	6	
## 12	akhil-marsonya27	May 20, 2019	1	
## 13	Rob1331	Nov 10, 2023	10	
## 14	alshamari-marwa	May 18, 2020	9	
## 15	tobiascramon	Nov 8, 2022	9	
## 16	adamheritage-15333	May 5, 2019	9	
## 17	LASTRONOME	Jun 2, 2020	10	
## 18	SpitOnAStranger	May 9, 2019	8	
## 19	psypeterson	Apr 16, 2011	10	
## 20	el-absy	May 19, 2019	7	
## 1				It could have been the best TV series ever made...
## 2				A perfect example of: Falling in Love with the Wrong Guy
## 3				Seasons 1-6: outstanding. 7: daft but good. 8: disappointing
## 4				Can you just make the remake the season finale?
## 5				Game of Thrones
## 6				Captivating and Gripping but a Disappointing Final Season
## 7				Despite the final season, Game of Thrones remains an all time classic
## 8				One of the best shows ever
## 9				Why just why? This show could have been the best ever.
## 10				This is a television show?
## 11				Imagine an Ice Cream Shop
## 12				A Message to Dan and Dave
## 13				Amazing
## 14				Extraordinary untill season 8
## 15				one the best shows ever made
## 16				Can we please just restart season 8, perhaps 7 as well, but mainly 8
## 17				almost perfect
## 18				This was an 10/10 until S08E03
## 19				Excellent adaptation.
## 20				Great Beginning, WORST Ending!

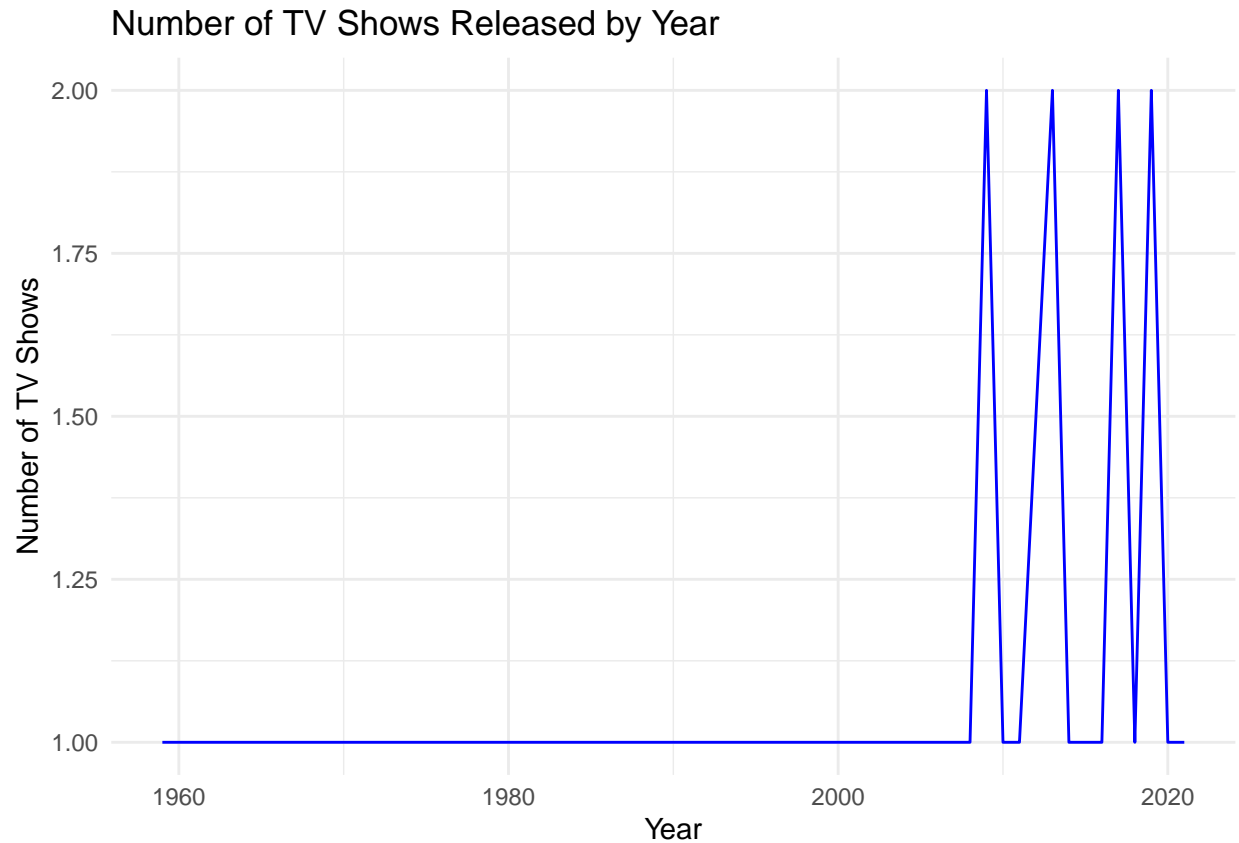
```
##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9 Was over-time on a gradual binge of watching 'Game of Thrones' from the first episode (gradual be
## 10
## 11
## 12
## 13
## 14
## 15
## 16
## 17
## 18
## 19
## 20
```

3. Time series for tv shows released by year and the most number of tv shows released.

```
library(ggplot2)
years <- substr(years, 1,4)
years <- as.numeric(years)

ggplot(data.frame(Year = years), aes(x = Year)) +
  geom_line(stat = "count", fill = "skyblue", color = "blue") +
  labs(title = "Number of TV Shows Released by Year",
       x = "Year",
       y = "Number of TV Shows") +
  theme_minimal()
```

```
## Warning in geom_line(stat = "count", fill = "skyblue", color = "blue"):
## Ignoring unknown parameters: 'fill'
```



```
most_shows_year <- as.data.frame(table(years))
most_shows_year <- most_shows_year[which.max(most_shows_year$Freq), ]
print(most_shows_year)
```

```
##      years Freq
## 11  2009      2
```

4. Select 5 categories from Amazon and select 30 products from each category.

```
# Load necessary libraries
library(rvest)
library(httr)
library(dplyr)
library(polite)
library(stringr)

url <- "https://www.amazon.com/"
session <- bow(url,
               user_agent = "Educational")
session
```

```
## <polite session> https://www.amazon.com/
##      User-agent: Educational
##      robots.txt: 138 rules are defined for 5 bots
##      Crawl delay: 5 sec
##      The path is scrapable for this user-agent
```

```
# Define URLs
urls <- c('https://www.amazon.com/s?k=backpacks&crd=35ZQ1H72MC3G9&sprefix=backpacks%2Caps%2C590&ref=nb_sb_noss',
          'https://www.amazon.com/s?k=laptops&crd=L7MQBW7MD4SX&sprefix=laptopb%2Caps%2C1304&ref=nb_sb_noss',
          'https://www.amazon.com/s?k=phone+case&dc&crd=1VPDCJ87S93TL&sprefix=phone+cas%2Caps%2C451&ref=nb_sb_noss',
          'https://www.amazon.com/s?k=mountain+bike&crd=1ZQR71S8XHZN6&sprefix=mountain+bik%2Caps%2C499&ref=nb_sb_noss',
          'https://www.amazon.com/s?k=tshirt&crd=2RQIP7MP6IYAW&sprefix=tshirt%2Caps%2C443&ref=nb_sb_noss')

category_df <- data.frame(
  URL = urls,
  Category = c(
    "Backpacks",
    "Laptops",
    "Accessories",
    "Sports",
    "Clothing"
  )
)
```

5. Extract the price, description, ratings and reviews of each product.

- Code to scrape price, description, and ratings of each products:

```
amazon_products <- function(url) {
  page <- read_html(url)

  name <- page %>%
    html_nodes(".a-size-medium.a-spacing-none.a-color-base.a-text-normal") %>%
    html_text()

  price <- page %>%
    html_nodes("span.a-price-whole") %>%
    html_text() %>%
    gsub("\\\\.", "", .) %>%
    as.numeric()

  ratings <- page %>%
    html_nodes("span.a-icon-alt") %>%
    html_text() %>%
    gsub(" out of 5 stars", "", .) %>%
    gsub(" Stars & Up", "", .) %>%
    as.numeric()

  data.frame(
    Description = name[1:30],
    Price = price[1:30],
    Ratings = ratings[1:30]
  )
}

products <- lapply(urls, amazon_products)
```

```
## Warning in page %>% html_nodes("span.a-price-whole") %>% html_text() %>% : NAs
## introduced by coercion
```

```
names(products) <- category_df$Category
products[["Backpacks"]]
```

```
##
## 1 Amazon Basics Travel Backpack, 15.6 inch Laptop Backpack Flight Approved, Carry-on Backpack Bag Luggage,
## 2 ZOMFELT Travel Backpack for Women Men, Carry on Backpack, TSA 15.6 inch Laptop Backpack Flight Approved, Carry-on Backpack Bag Luggage,
## 3 SHRRAD00 Extra Large 50L Travel Laptop Backpack with USB Charging Port, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 4
## 5
## 6
## 7 LOVEV00K Laptop Backpack for Women, 15.6 Inch Work Business Backpacks Purse with USB Port, Large Capacity, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 8 Carhartt 25L Classic Backpack, Durable Water-Resistant Polyester, Black, One Size
## 9
## 10
## 11 adidas Striker Team Sports Backpack, 25L, Black, One Size
## 12 Travel Backpack For Women Men Flight Approved, Carry-on Backpack Bag Luggage,
## 13
## 14 JanSport Laptop Backpack - Computer Bag with USB Charging Port, Black, One Size
## 15 YOREPEK Travel Backpack, Extra Large 50L Laptop Backpacks for Men Women, Water Resistant Colorful, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 16
## 17 Travel Backpack, Extra Large Backpack, Carry On Backpack, 50L Expandable Airline Approved Water Resistant, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 18 LOVEV00K Laptop Backpack for Women, 15.6 Inch Work Business Backpacks Purse with USB Port, Large Capacity, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 19 Laptop Backpack,Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 20 Carhartt 21L, Durable Water-Resistant Polyester, Black, One Size
## 21 tomtoc Travel Backpack 40L, TSA Friendly Flight Approved Carry-on Luggage Hand Wagon, Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging Port,
## 22 Laptop Backpack for Men Women, Business Travel Laptop Backpack with USB Charging Port,
## 23
## 24
## 25
## 26
## 27
## 28
## 29
## 30
## Price Ratings
## 1 21 4.4
## 2 25 4.7
## 3 99 4.7
## 4 23 4.8
## 5 29 4.5
## 6 26 4.8
## 7 39 4.7
## 8 30 4.7
## 9 65 4.5
## 10 29 4.7
## 11 60 4.8
## 12 74 4.6
## 13 39 4.6
## 14 30 4.7
## 15 22 4.8
## 16 53 4.5
## 17 80 4.6
## 18 39 4.7
```



## 19	29	4.7
## 20	29	4.7
## 21	52	4.5
## 22	80	4.8
## 23	21	4.6
## 24	39	4.3
## 25	29	4.7
## 26	30	4.6
## 27	19	4.7
## 28	32	4.6
## 29	NA	4.1
## 30	NA	4.5

```
products[["Laptops"]]
```

```
##
## 1          jumper Laptop, 12GB RAM 640GB ROM, 5305U Processor, 15.6 Inch Computer with O
## 2          Lenovo V15 15.6" FHD Business Laptop Computer, Intel Dual-Core Processor, 16GB DDR4 RAM, 2
## 3  Acer Aspire 3 A315-24P-R7VH Slim Laptop | 15.6" Full HD IPS Display | AMD Ryzen 3 7320U Quad-Core
## 4          HP 14 Laptop, Intel Celeron N4020, 4 GB RAM, 64 GB Storage, 14-inch Micro-edge HD Display, Wi
## 5  HP Stream 14" HD BrightView Laptop, Intel Celeron N4120, 16GB RAM, 288GB Storage (128GB eMMC + 160
## 6          HP 14" Ultral Light Laptop for Students and Business, Intel Quad-C
## 7
## 8  Dell Inspiron Touchscreen Laptop, 15.6" Business & Student Laptop Computer, Windows 11 Pro Laptop
## 9          HP Portable Laptop, Student and Business, 14" HD Display, Intel Quad-Core N
## 10          Lenovo IdeaPad 3i Chromebook, 15.6" F
## 11          Lenovo V15 15.6" FHD Business Laptop Computer, Intel Dual-Core Processor, 16GB DDR4 RAM, 2
## 12          16" Casual Gaming Laptop, BaseBook Pro Computer Laptops for Student with Core i5-1035G4, 1
## 13          ASUS 15.6" Vivobook
## 14          Lenovo IdeaPad Slim 3 Chromebook - 2024 - Lightweight Laptop - Waves MaxxAudio® Speake
## 15          acer Gateway Chromebook 311 CB0311-1H-C1MX Laptop | Intel Celeron N4500
## 16          HP 14 inch Laptop, HD Display, 12th Generation Intel C
## 17          AOC Gaming Laptop, 16.1" FHD Display, AMD Ryzen 7 Octa-Core CPU, 16GB RAM 512GB SSD, W
## 18          ASUS Chromebook CM14 Laptop, 14" HD Anti-Glare Display
## 19          Lenovo Newest Flagship Chromebook, 14'' FHD Touchscreen Slim Thin Light Laptop Computer, 8-C
## 20          HP 15.6" Portable Laptop (Include 1 Year Microsoft 365), HD Display, Intel Quad-Core
## 21          240W Laptop Charger for MSI Stealth 16 17 17Studio GS77 Vector GP77 Sword 15 Katana 15 1
## 22
## 23
## 24
## 25
## 26
## 27
## 28
## 29
## 30
## Price Ratings
## 1      NA      5.0
## 2      369     4.1
## 3      284     4.4
## 4      176     4.0
## 5      309     4.3
## 6      212     4.1
## 7      135     4.0
```

## 8	500	4.1
## 9	202	4.0
## 10	239	4.2
## 11	369	4.1
## 12	429	4.0
## 13	179	4.1
## 14	149	4.6
## 15	348	4.5
## 16	599	4.2
## 17	157	4.4
## 18	204	4.2
## 19	274	4.3
## 20	75	4.2
## 21	45	5.0
## 22	NA	5.0
## 23	NA	4.0
## 24	NA	NA
## 25	NA	NA
## 26	NA	NA
## 27	NA	NA
## 28	NA	NA
## 29	NA	NA
## 30	NA	NA

```
products[["Accessories"]]
```

```
##
## 1      Temdan Magnetic for iPhone 14 Pro Case Waterproof,Built-in Screen Protector[IP68 Underwater][
## 2  BERFY for iPhone 16 Pro Max Case, Compatible with Magsafe, with 2X Screen Protectors + 2X Camera
## 3      ESR for iPhone 14 Case/iPhone 13 Case, Compatible with MagSafe, Shockproof
## 4      ORNARTO Compatible with iPhone
## 5      OtterBox iPhone 15, iPhon
## 6      OtterBox iPhone
## 7      Neon Clear Case for iPhone 14 Pro (6.1"), Cute Retro Vibrant Design Phone Cases for Women 80s
## 8      OtterBox iPhone 13 Pro Max
## 9
## 10
## 11     OtterBox iPhone SE 3rd & 2nd Gen, iPhone 8 & iPhone 7 (not Compatible with Plus Sized Models)
## 12      Compatible for iPhone 13 Case Cut
## 13      Temdan for iPhone 16 Pro Case Clear, [Compatible with Magsafe][Anti-Ye
## 14      FABSPARK Phone Case for iPhone 13 C
## 15
## 16     Miracase Magnetic for iPhone 15 Pro Case [Compatible with MagSafe] Full-Body Phone case with Bu
## 17      Anuck for iPhone 12 Pro Case Magnetic Phone Case Compatible with MagSafe, Soft TPU Bu
## 18      elago Compatible with iPhone 14 Pro Case, Liquid Silicone Case, Full Body
## 19      OtterBox
## 20  TORRAS Stronger Magnetic & Shockproof for iPhone 16 Pro Case, Military Grade Drop Protection, Comp
## 21      Otter
## 22      Cordking Designed for iPhone 13 Pro Case, Silicone Full Cover [Enhanced Camera Protectio
## 23
## 24
## 25
## 26
## 27
```

```

## 28
## 29
## 30
##      Price Ratings
## 1      39      4.4
## 2       9      4.6
## 3      12      4.6
## 4       9      4.5
## 5      21      4.6
## 6      19      4.3
## 7      39      4.6
## 8      15      4.5
## 9      27      4.4
## 10     21      4.5
## 11     14      4.6
## 12     24      4.5
## 13     25      4.6
## 14     58      4.2
## 15     26      4.1
## 16      9      4.7
## 17      8      4.7
## 18      8      4.6
## 19     23      4.2
## 20     17      4.7
## 21      7      4.3
## 22     12      4.5
## 23     21      4.4
## 24     22      4.6
## 25     17      4.4
## 26     13      4.5
## 27      7      4.6
## 28     15      4.5
## 29     16      4.6
## 30     25      4.5

```

```
products[["Sports"]]
```

```

##
## 1      Huffy Stone Mountain Hardtail Mountain Bike for Boys/Girls/Men/Women, 20"/24"/26
## 2      Mongoose Flatrock 21-Speed Hardtail Mountain Bike, 24 to 26
## 3      Huffy Stone Mountain Hardtail Mountain Bike for Boys/Girls/Men/Women, 20"/24"/26
## 4      HILAND 26 27.5 Inch Mountain Bike
## 5      Mongoose Flatrock 21-Speed Hardtail Mountain Bike, 24 to 26
## 6      Dynacraft Vertical Alpine Eagle Mountain Bike - Rugged and Durable Design, 24-Inch
## 7      Dynacraft Magna Echo Ridge Mountain Bike - Rugged and Durable Design, 24-Inch
## 8
## 9      Mongoose Malus Mens and Women Fat Tire Mountain Bike, 26-Inch Bicycle Wheel
## 10     HILAND 26 Inch Womens and Mens Mountain Bike
## 11     Schwinn High Timber Mountain Bike for Adult Youth Men Women, 24-Inch Wheels, Full Suspension, 24-Speed Shimano
## 12     Dynacraft Air Zone Aftershock 20" Mountain Bike - Rugged and Durable Design, 20-Inch
## 13     Schwinn Traxion Mountain Bike for Adult Men Women, 29-Inch Wheels, Full Suspension, 24-Speed Shimano
## 14     Schwinn Bonafide Men and Women Mountain Bike, 24-Inch Wheels, Full Suspension, 24-Speed Shimano
## 15     Grafton Mountain Bike for Adult and Youth Men and Women, 24/26 / 27.5-Inch Wheels, Full Suspension, 24-Speed Shimano
## 16     Dynacraft Air Zone Aftershock 20" Mountain Bike - Rugged and Durable Design, 20-Inch

```

## 17	HILAND Mens and Womens Mountain Bike, 26 Inch 21 Speed Mountain Bicycl
## 18	HH HILAND 24 26 incl
## 19	HH HILAND 26 27.5 29 Inch Mountain
## 20	Mongoose Dolomite Fat Tire Mountain Bike, for A
## 21	HILAND 26 Inch Womens and Mens I
## 22	HH HILAND 24 26 incl
## 23	
## 24	
## 25	
## 26	
## 27	
## 28	
## 29	
## 30	

##	Price	Ratings
## 1	249	3.9
## 2	309	4.0
## 3	208	3.9
## 4	209	4.6
## 5	379	4.0
## 6	99	4.6
## 7	34	4.4
## 8	294	4.1
## 9	24	4.1
## 10	158	4.3
## 11	134	4.0
## 12	492	4.2
## 13	167	4.4
## 14	414	4.0
## 15	137	4.0
## 16	619	4.2
## 17	299	4.3
## 18	137	4.2
## 19	239	3.6
## 20	170	4.2
## 21	209	4.2
## 22	406	4.0
## 23	167	3.6
## 24	170	4.4
## 25	74	4.0
## 26	36	4.0
## 27	47	4.8
## 28	119	4.7
## 29	NA	4.6
## 30	NA	4.5

```
products[["Clothing"]]
```

##	Description	Price	Ratings
## 1	<NA>	16	4.3
## 2	<NA>	19	4.6
## 3	<NA>	22	4.4
## 4	<NA>	6	4.5
## 5	<NA>	14	4.5

## 6	<NA>	21	4.5
## 7	<NA>	12	4.5
## 8	<NA>	26	4.6
## 9	<NA>	34	4.4
## 10	<NA>	6	4.5
## 11	<NA>	19	4.2
## 12	<NA>	8	4.5
## 13	<NA>	26	4.7
## 14	<NA>	76	4.5
## 15	<NA>	5	4.3
## 16	<NA>	24	4.4
## 17	<NA>	17	4.0
## 18	<NA>	25	4.2
## 19	<NA>	24	4.7
## 20	<NA>	19	4.4
## 21	<NA>	24	4.1
## 22	<NA>	34	4.4
## 23	<NA>	39	4.5
## 24	<NA>	10	4.3
## 25	<NA>	54	4.3
## 26	<NA>	10	4.4
## 27	<NA>	30	5.0
## 28	<NA>	9	4.5
## 29	<NA>	22	4.6
## 30	<NA>	20	4.4

Code to scrape reviews of each products

```
reviews_scrape <- function(url) {
  page <- read_html(url)

  review_link <- page %>%
    html_nodes("a.a-link-normal.s-underline-text.s-underline-link-text.s-link-style.a-text-normal") %>%
    html_attr("href") %>%
    unique() %>%
    paste0("https://www.amazon.com", .)

  data.frame(
    review_links = review_link[1:30]
  )
}

review_links_df <- lapply(urls, reviews_scrape)

backpack <- review_links_df[[1]]$review_links
laptops <- review_links_df[[2]]$review_links
accessories <- review_links_df[[3]]$review_links
sports <- review_links_df[[4]]$review_links
clothing <- review_links_df[[5]]$review_links

reviews_text <- function(urls) {

  results <- data.frame(
    Reviews = character(length(urls)),
```

```

    stringsAsFactors = FALSE
  )

  # loop through each URL
  for (i in seq_along(urls)) {
    if (is.na(urls[i])) {
      results$Reviews[i] <- NA
    } else {
      # scrape reviews
      page <- read_html(urls[i])
      reviews_data <- page %>%
        html_nodes("p.a-spacing-small") %>%
        .[1] %>%
        html_text()

      results$Reviews[i] <- if (length(reviews_data) > 0) reviews_data else NA
    }
  }

  return(results)
}

backpack_reviews <- reviews_text(backpack)
laptop_reviews <- reviews_text(laptops)
accessories_reviews <- reviews_text(accessories)
sports_reviews <- reviews_text(sports)
clothing_reviews <- reviews_text(clothing)

```

Complete Data Frame of price, description, ratings and reviews of each product.

```

backpack_category <- cbind(products[["Backpacks"]], backpack_reviews)
laptop_category <- cbind(products[["Laptops"]], laptop_reviews)
accessories_category <- cbind(products[["Accessories"]], accessories_reviews)
sports_category <- cbind(products[["Sports"]], sports_reviews)
clothing_category <- cbind(products[["Clothing"]], clothing_reviews)

```

6. Describe the data you have extracted. ##### START #####

The extracted data consists of information from the five categories we have selected from Amazon. These include: Backpacks, Laptops, Accessories, Sports, and Clothing. For each category, 30 products were selected, resulting in a total of 150 products with details including price, description, ratings, and reviews for each product.

**END**

7. What will be your use case for the data you have extracted? ##### START #####

If we use the extracted data, we can aim to evaluate the value for money offered by different product categories based on their rating and price. By calculating the rating-to-price ratio for each category, we can identify which categories provide the best perceived quality relative to their cost.

END

8. Create graphs regarding the use case, and briefly explain it.

The graph allows for easy comparison of how well each category performs in terms of value for money. Categories with taller bars indicate a higher rating-to-price ratio, suggesting better perceived value for money

```
df_combined <- rbind(
  cbind(backpack_category, Product_Name = backpack_category$Description, Category = "Backpacks"),
  cbind(laptop_category, Product_Name = laptop_category$Description, Category = "Laptops"),
  cbind(accessories_category, Product_Name = accessories_category$Description, Category = "Accessories"),
  cbind(sports_category, Product_Name = sports_category$Description, Category = "Sports"),
  cbind(clothing_category, Product_Name = clothing_category$Description, Category = "Clothing")
)

df_combined$Price <- as.numeric(as.character(df_combined$Price))
df_combined$Ratings <- as.numeric(as.character(df_combined$Ratings))

df_combined <- df_combined %>%
  mutate(rating_to_price_ratio = Ratings / Price)

categories <- unique(df_combined$Category)

par(mfrow = c(ceiling(length(categories) / 2), 2))

for (category in categories) {
  category_products <- df_combined %>% filter(Category == category)
  short_name <- sapply(category_products$Description, function(x) {
    paste(strsplit(x, " ")[[1]][1:2], collapse = " ")
  })

  barplot(
    category_products$rating_to_price_ratio,
    names.arg = short_name,
    main = paste("Rating to Price Ratio for", category),
    ylab = "Rating to Price Ratio",
    col = rainbow(nrow(category_products)),
    las = 2,
    cex.names = 0.5
  )
}
```



9. Graph the price and the ratings for each category. Use basic plotting functions and ggplot2 package.  
 ###Basic Plotting##

```
library(dplyr)
library(ggplot2)
# Base R Plotting
par(mfrow = c(2, 3))

for (cat in unique(df_combined$Category)) {
  data <- df_combined[df_combined$Category == cat, ]

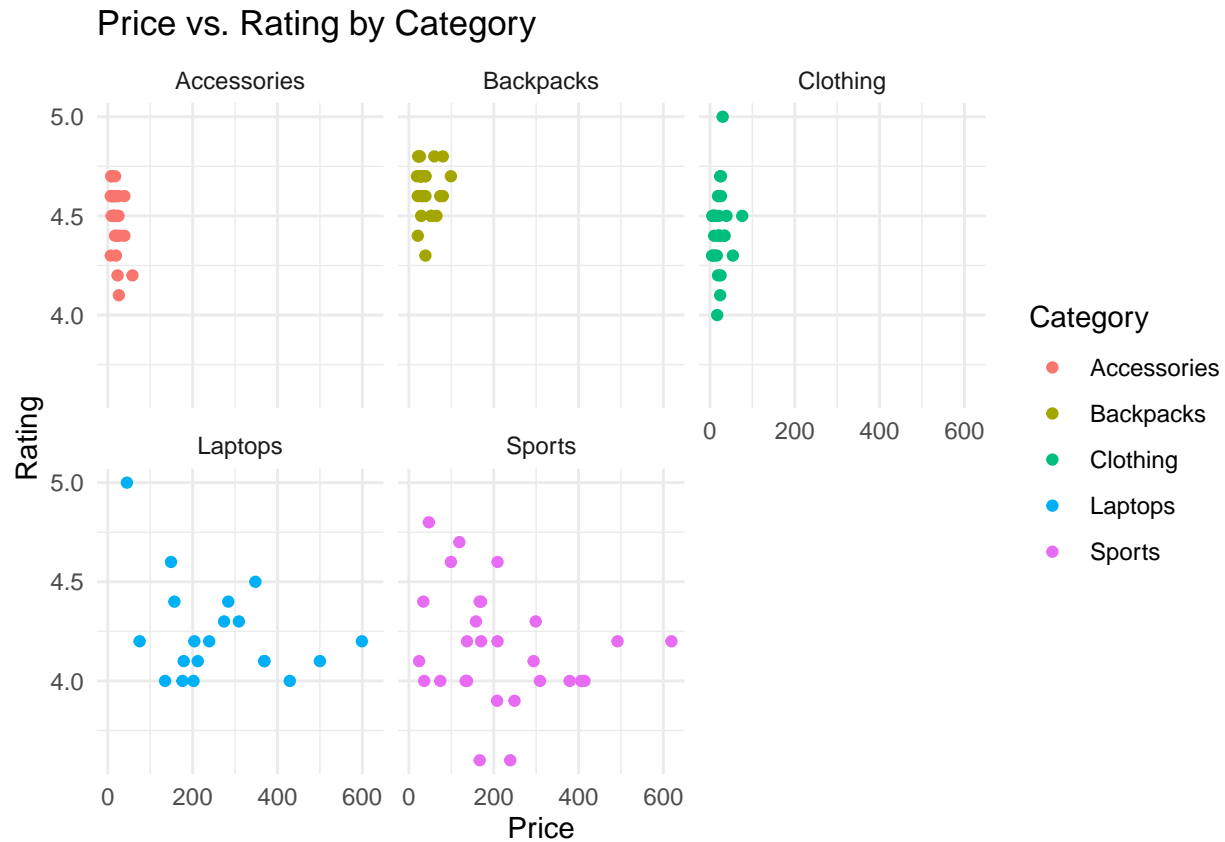
  plot(
    data$Price, data$Ratings,
    main = paste("Price vs Rating -", cat),
    xlab = "Price",
    ylab = "Rating",
    col = "blue",
    pch = 19
  )
}

# ggplot2 Visualization
ggplot(df_combined, aes(x = Price, y = Ratings, color = Category)) +
  geom_point() +
  facet_wrap(~Category) +
```



```
labs(title = "Price vs. Rating by Category", x = "Price", y = "Rating") +
theme_minimal()
```

```
## Warning: Removed 14 rows containing missing values or values outside the scale range
## ('geom_point()').
```



10. Rank the products of each category by price and ratings. Explain briefly.

```
library(dplyr)

# Backpacks
backpack_ranked <- backpack_category %>%
  mutate(
    Rank_by_Price = rank(Price, ties.method = "min"),
    Rank_by_Rating = rank(-Ratings, ties.method = "min")
  ) %>%
  arrange(Rank_by_Price, Rank_by_Rating)

# Laptops
laptop_ranked <- laptop_category %>%
  mutate(
    Rank_by_Price = rank(Price, ties.method = "min"),
    Rank_by_Rating = rank(-Ratings, ties.method = "min")
  ) %>%
```

```

    arrange(Rank_by_Price, Rank_by_Rating)

# Accessories
accessories_ranked <- accessories_category %>%
  mutate(
    Rank_by_Price = rank(Price, ties.method = "min"),
    Rank_by_Rating = rank(-Ratings, ties.method = "min")
  ) %>%
  arrange(Rank_by_Price, Rank_by_Rating)

# Sports
sports_ranked <- sports_category %>%
  mutate(
    Rank_by_Price = rank(Price, ties.method = "min"),
    Rank_by_Rating = rank(-Ratings, ties.method = "min")
  ) %>%
  arrange(Rank_by_Price, Rank_by_Rating)

# Clothing
clothing_ranked <- clothing_category %>%
  mutate(
    Rank_by_Price = rank(Price, ties.method = "min"),
    Rank_by_Rating = rank(-Ratings, ties.method = "min")
  ) %>%
  arrange(Rank_by_Price, Rank_by_Rating)

print(backpack_ranked)

```

```

##
## 1
## 2
## 3
## 4 Amazon Basics Travel Backpack, Extra Large 50L Laptop Backpacks for Men Women, Water Resistant Co
## 5 YOREPEK Travel Backpack, Extra Large 50L Laptop Backpacks for Men Women, Water Resistant Co
## 6 ZOMFELT Travel Backpack for Women Men, Carry on Backpack, TSA 15.6 inch Laptop Backpack Flight
## 7
## 8
## 9 Laptop Backpack,Business Travel Anti Theft Slim Durable Laptops Backpack with USB Charging
## 10 Carhartt 21L, Durable Water-Resistant P
## 11
## 12
## 13 Carhartt 25L Classic Backpack, Durable
## 14 JanSport Laptop Backpack - Computer Bag w
## 15
## 16
## 17 LOVEVOK Laptop Backpack for Women, 15.6 Inch Work Business Backpacks Purse with USB Port, Large
## 18 LOVEVOK Laptop Backpack for Women, 15.6 Inch Work Business Backpacks Purse with USB Port, Large
## 19
## 20
## 21 tomtoc Travel Backpack 40L, TSA Friendly Flight Approved Carry-on Luggage Hand Wa
## 22
## 23 adidas Striker Team Spo
## 24

```

## 25 Travel Backpack For Women Men Flight Approved, Carry-on Backpack Bag Luggage,  
 ## 26 Laptop Backpack for Men Women, Business Travel Laptop Backpack with USB Charging Port  
 ## 27 Travel Backpack, Extra Large Backpack, Carry On Backpack, 50L Expandable Airline Approved Water Resistant  
 ## 28 SHRRAD00 Extra Large 50L Travel Laptop Backpack with USB Charging Port  
 ## 29  
 ## 30

##	Price	Ratings
## 1	19	4.7
## 2	21	4.6
## 3	21	4.4
## 4	22	4.8
## 5	23	4.8
## 6	25	4.7
## 7	26	4.8
## 8	29	4.7
## 9	29	4.7
## 10	29	4.7
## 11	29	4.7
## 12	29	4.5
## 13	30	4.7
## 14	30	4.7
## 15	30	4.6
## 16	32	4.6
## 17	39	4.7
## 18	39	4.7
## 19	39	4.6
## 20	39	4.3
## 21	52	4.5
## 22	53	4.5
## 23	60	4.8
## 24	65	4.5
## 25	74	4.6
## 26	80	4.8
## 27	80	4.6
## 28	99	4.7
## 29	NA	4.1
## 30	NA	4.5

##

## 1 Customers like the fit, build quality, and style of the backpack.

## 2 Customers like the build quality, storage capacity, and bag quality of the backpack. They mention the backpack is comfortable to wear.

## 3 Customers like the durability, space, and travelability of the backpack.

## 4 The backpack resists the entry of water into it to a certain extent, which means that the contents are safe.

## 5

## 6

## 7 Customers like the roomy, style, and build quality of the backpack.

## 8

## 9 Customers like the color of the backpack.

## 10

## 11 Customers like the color of the backpack.

## 12 Customers like the quality of the backpack.

## 13 Customers like the pockets, build quality, and style of the backpack.

## 14

## 15

## 16

```

## 17 Customers like the storage capacity, travelability, and looks of the backpack. They mention it's p
## 18 Customers like the durability, space, and quality of the backpack. Th
## 19 Customers like the build quality, space, and valu
## 20
## 21
## 22 Customers like the storage capacity, travelability, and looks of the backpack. They mention it's p
## 23 Customers like the roomy, style, and build quality of the backpack
## 24
## 25
## 26 Customers like the roomy, style, and build quality of the backpack
## 27 Customers like the
## 28 Customers like the backpack for its roominess, durability, and value for m
## 29
## 30
## Rank_by_Price Rank_by_Rating
## 1 1 6
## 2 2 17
## 3 2 28
## 4 4 1
## 5 5 1
## 6 6 6
## 7 7 1
## 8 8 6
## 9 8 6
## 10 8 6
## 11 8 6
## 12 8 23
## 13 13 6
## 14 13 6
## 15 13 17
## 16 16 17
## 17 17 6
## 18 17 6
## 19 17 17
## 20 17 29
## 21 21 23
## 22 22 23
## 23 23 1
## 24 24 23
## 25 25 17
## 26 26 1
## 27 26 17
## 28 28 6
## 29 29 30
## 30 30 23

```

```
print(laptop_ranked)
```

```

##
## 1 240W Laptop Charger for MSI Stealth 16 17 17Studio GS77 Vector GP77 Sword 15 Katana 15 1
## 2 HP 15.6" Portable Laptop (Include 1 Year Microsoft 365), HD Display, Intel Quad-Core
## 3
## 4 Lenovo IdeaPad Slim 3 Chromebook - 2024 - Lightweight Laptop - Waves MaxxAudio® Speake
## 5 AOC Gaming Laptop, 16.1" FHD Display, AMD Ryzen 7 Octa-Core CPU, 16GB RAM 512GB SSD, W

```

```

## 6      HP 14 Laptop, Intel Celeron N4020, 4 GB RAM, 64 GB Storage, 14-inch Micro-edge HD Display, Wi
## 7                                             ASUS 15.6" Vivobook
## 8      HP Portable Laptop, Student and Business, 14" HD Display, Intel Quad-Core N
## 9      ASUS Chromebook CM14 Laptop, 14" HD Anti-Glare Display
## 10     HP 14" Ultral Light Laptop for Students and Business, Intel Quad-C
## 11     Lenovo IdeaPad 3i Chromebook, 15.6" F
## 12     Lenovo Newest Flagship Chromebook, 14'' FHD Touchscreen Slim Thin Light Laptop Computer, 8-C
## 13 Acer Aspire 3 A315-24P-R7VH Slim Laptop | 15.6" Full HD IPS Display | AMD Ryzen 3 7320U Quad-Cor
## 14 HP Stream 14" HD BrightView Laptop, Intel Celeron N4120, 16GB RAM, 288GB Storage (128GB eMMC + 16
## 15     acer Gateway Chromebook 311 CB0311-1H-C1MX Laptop | Intel Celeron N4500
## 16     Lenovo V15 15.6" FHD Business Laptop Computer, Intel Dual-Core Processor, 16GB DDR4 RAM, 1
## 17     Lenovo V15 15.6" FHD Business Laptop Computer, Intel Dual-Core Processor, 16GB DDR4 RAM, 1
## 18     16" Casual Gaming Laptop, BaseBook Pro Computer Laptops for Student with Core i5-1035G4, 1
## 19 Dell Inspiron Touchscreen Laptop, 15.6" Business & Student Laptop Computer, Windows 11 Pro Laptop
## 20     HP 14 inch Laptop, HD Display, 12th Generation Intel C
## 21     jumper Laptop, 12GB RAM 640GB ROM, 5305U Processor, 15.6 Inch Computer with O
## 22
## 23
## 24
## 25
## 26
## 27
## 28
## 29
## 30
##      Price Ratings
## 1      45      5.0
## 2      75      4.2
## 3     135      4.0
## 4     149      4.6
## 5     157      4.4
## 6     176      4.0
## 7     179      4.1
## 8     202      4.0
## 9     204      4.2
## 10    212      4.1
## 11    239      4.2
## 12    274      4.3
## 13    284      4.4
## 14    309      4.3
## 15    348      4.5
## 16    369      4.1
## 17    369      4.1
## 18    429      4.0
## 19    500      4.1
## 20    599      4.2
## 21     NA      5.0
## 22     NA      5.0
## 23     NA      4.0
## 24     NA      NA
## 25     NA      NA
## 26     NA      NA
## 27     NA      NA
## 28     NA      NA

```

```

## 29      NA      NA
## 30      NA      NA
##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9
## 10 Customers like the value, ease of use, and color of the notebook computer. They mention it's a go
## 11
## 12
## 13
## 14
## 15
## 16
## 17
## 18
## 19
## 20
## 21                                     Customers app
## 22
## 23
## 24
## 25
## 26
## 27
## 28
## 29
## 30
##      Rank_by_Price Rank_by_Rating
## 1              1              1
## 2              2             10
## 3              3             19
## 4              4              4
## 5              5              6
## 6              6             19
## 7              7             14
## 8              8             19
## 9              9             10
## 10             10             14
## 11             11             10
## 12             12              8
## 13             13              6
## 14             14              8
## 15             15              5
## 16             16             14
## 17             16             14
## 18             18             19
## 19             19             14
## 20             20             10

```

## 21	21	1
## 22	22	1
## 23	23	19
## 24	24	24
## 25	25	25
## 26	26	26
## 27	27	27
## 28	28	28
## 29	29	29
## 30	30	30

```
print(accessories_ranked)
```

```
##
## 1
## 2
## 3 Anuck for iPhone 12 Pro Case Magnetic Phone Case Compatible with MagSafe, Soft TPU Bu
## 4 elago Compatible with iPhone 14 Pro Case, Liquid Silicone Case, Full Body
## 5 Miracase Magnetic for iPhone 15 Pro Case [Compatible with MagSafe] Full-Body Phone case with Bu
## 6 BERFY for iPhone 16 Pro Max Case, Compatible with Magsafe, with 2X Screen Protectors + 2X Camera
## 7 ORNARTO Compatible with iPhone
## 8 ESR for iPhone 14 Case/iPhone 13 Case, Compatible with MagSafe, Shockproof
## 9 Cordking Designed for iPhone 13 Pro Case, Silicone Full Cover [Enhanced Camera Protection]
## 10
## 11 OtterBox iPhone SE 3rd & 2nd Gen, iPhone 8 & iPhone 7 (not Compatible with Plus Sized Models)
## 12 OtterBox iPhone 13 Pro Max
## 13
## 14
## 15 TORRAS Stronger Magnetic & Shockproof for iPhone 16 Pro Case, Military Grade Drop Protection, Comp
## 16
## 17 OtterBox iPhone
## 18 OtterBox iPhone 15, iPhone
## 19
## 20
## 21
## 22 OtterBox
## 23 Compatible for iPhone 13 Case Cut
## 24 Temdan for iPhone 16 Pro Case Clear, [Compatible with Magsafe][Anti-Yel
## 25
## 26
## 27
## 28 Neon Clear Case for iPhone 14 Pro (6.1"), Cute Retro Vibrant Design Phone Cases for Women 80s
## 29 Temdan Magnetic for iPhone 14 Pro Case Waterproof,Built-in Screen Protector[IP68 Underwater][
## 30 FABSPARK Phone Case for iPhone 13 C
## Price Ratings
## 1 7 4.6
## 2 7 4.3
## 3 8 4.7
## 4 8 4.6
## 5 9 4.7
## 6 9 4.6
## 7 9 4.5
## 8 12 4.6
## 9 12 4.5
```

```

## 10      13      4.5
## 11      14      4.6
## 12      15      4.5
## 13      15      4.5
## 14      16      4.6
## 15      17      4.7
## 16      17      4.4
## 17      19      4.3
## 18      21      4.6
## 19      21      4.5
## 20      21      4.4
## 21      22      4.6
## 22      23      4.2
## 23      24      4.5
## 24      25      4.6
## 25      25      4.5
## 26      26      4.1
## 27      27      4.4
## 28      39      4.6
## 29      39      4.4
## 30      58      4.2
##
## 1
## 2
## 3
## 4
## 5
## 6
## 7
## 8
## 9
## 10
## 11 Customers like the color, durability, and screen protection of the cell phone case. They mention
## 12
## 13
## 14
## 15
## 16
## 17
## 18
## 19
## 20
## 21
## 22
## 23
## 24
## 25
## 26
## 27
## 28
## 29
## 30
##      Rank_by_Price Rank_by_Rating
## 1              1              4

```



## 2	1	26
## 3	3	1
## 4	3	4
## 5	5	1
## 6	5	4
## 7	5	14
## 8	8	4
## 9	8	14
## 10	10	14
## 11	11	4
## 12	12	14
## 13	12	14
## 14	14	4
## 15	15	1
## 16	15	22
## 17	17	26
## 18	18	4
## 19	18	14
## 20	18	22
## 21	21	4
## 22	22	28
## 23	23	14
## 24	24	4
## 25	24	14
## 26	26	30
## 27	27	22
## 28	28	4
## 29	28	22
## 30	30	28

```
print(sports_ranked)
```

```
##
## 1      Mongoose Malus Mens and Women Fat Tire Mountain Bike, 26-Inch Bicycle Wh
## 2      Dynacraft Magna Echo Ridge Mountain Bike - Rugged and Durable Desig
## 3
## 4
## 5
## 6      Dynacraft Vertical Alpine Eagle Mountain Bike - Rug
## 7
## 8      Schwinn High Timber Mountain Bike for Adult Youth Men Women
## 9      HH HILAND 24 26 inch
## 10     Grafton Mountain Bike for Adult and Youth Men and Women, 24/26 / 27.5-In
## 11     HILAND 26 Inch Womens and Mens I
## 12     Schwinn Traxion Mountain Bike for Adult Men Women, 29-Inch Wheels, Full Suspension, 24-Speed Shim
## 13
## 14
## 15     Mongoose Dolomite Fat Tire Mountain Bike, for A
## 16     Huffy Stone Mountain Hardtail Mountain Bike for Boys/Girls/Men/Women, 20"/24"/26
## 17     HILAND 26 27.5 Inch Mountain Bik
## 18     HILAND 26 Inch Womens and Mens I
## 19     HH HILAND 26 27.5 29 Inch Mountain
## 20     Huffy Stone Mountain Hardtail Mountain Bike for Boys/Girls/Men/Women, 20"/24"/26
## 21
```

## 22	HILAND Mens and Womens Mountain Bike, 26 Inch 21 Speed Mountain Bicycle
## 23	Mongoose Flatrock 21-Speed Hardtail Mountain Bike, 24 to 26 inch
## 24	Mongoose Flatrock 21-Speed Hardtail Mountain Bike, 24 to 26 inch
## 25	HH HILAND 24 26 inch
## 26	Schwinn Bonafide Men and Women's Mountain Bike, 26 inch
## 27	Dynacraft Air Zone Aftershock 20" Mountain Bike - Rugged and Durable Design, P
## 28	Dynacraft Air Zone Aftershock 20" Mountain Bike - Rugged and Durable Design, P
## 29	
## 30	
##	Price Ratings
## 1	24 4.1
## 2	34 4.4
## 3	36 4.0
## 4	47 4.8
## 5	74 4.0
## 6	99 4.6
## 7	119 4.7
## 8	134 4.0
## 9	137 4.2
## 10	137 4.0
## 11	158 4.3
## 12	167 4.4
## 13	167 3.6
## 14	170 4.4
## 15	170 4.2
## 16	208 3.9
## 17	209 4.6
## 18	209 4.2
## 19	239 3.6
## 20	249 3.9
## 21	294 4.1
## 22	299 4.3
## 23	309 4.0
## 24	379 4.0
## 25	406 4.0
## 26	414 4.0
## 27	492 4.2
## 28	619 4.2
## 29	NA 4.6
## 30	NA 4.5
##	
## 1	Customers like the fit, warmth, and durability of the shoes. They
## 2	Bikes are personal machines, and every bike fits a different need
## 3	Customers like the fit, comfort, and quality of the
## 4	
## 5	Customers like the design and ease of assembly of the bicycle. They
## 6	Customers
## 7	
## 8	
## 9	
## 10	
## 11	
## 12	
## 13	Customers like the c

```

## 14
## 15
## 16
## 17
## 18
## 19
## 20           Customers like the quality of the bicycle. They mention it's a pretty good bike and
## 21 Customers like the value for money, brakes quality, and ease of assembly of the bicycle. They mention
## 22           Customers like the quality of the bicycle. They mention it looks good.
## 23           Customers like the appearance of the bicycle.
## 24
## 25
## 26
## 27           Customers like the appearance and ease of assembly of the bicycle.
## 28
## 29           Customers like the fit, comfort, and look of the product. They mention it's a good bike.
## 30
##      Rank_by_Price Rank_by_Rating
## 1           1           17
## 2           2           7
## 3           3          19
## 4           4           1
## 5           5          19
## 6           6           3
## 7           7           2
## 8           8          19
## 9           9          12
## 10          9          19
## 11          11          10
## 12          12           7
## 13          12          29
## 14          14           7
## 15          14          12
## 16          16          27
## 17          17           3
## 18          17          12
## 19          19          29
## 20          20          27
## 21          21          17
## 22          22          10
## 23          23          19
## 24          24          19
## 25          25          19
## 26          26          19
## 27          27          12
## 28          28          12
## 29          29           3
## 30          30           6

```

```
print(clothing_ranked)
```

```

##      Description Price Ratings
## 1      <NA>      5      4.3
## 2      <NA>      6      4.5

```

## 3	<NA>	6	4.5
## 4	<NA>	8	4.5
## 5	<NA>	9	4.5
## 6	<NA>	10	4.4
## 7	<NA>	10	4.3
## 8	<NA>	12	4.5
## 9	<NA>	14	4.5
## 10	<NA>	16	4.3
## 11	<NA>	17	4.0
## 12	<NA>	19	4.6
## 13	<NA>	19	4.4
## 14	<NA>	19	4.2
## 15	<NA>	20	4.4
## 16	<NA>	21	4.5
## 17	<NA>	22	4.6
## 18	<NA>	22	4.4
## 19	<NA>	24	4.7
## 20	<NA>	24	4.4
## 21	<NA>	24	4.1
## 22	<NA>	25	4.2
## 23	<NA>	26	4.7
## 24	<NA>	26	4.6
## 25	<NA>	30	5.0
## 26	<NA>	34	4.4
## 27	<NA>	34	4.4
## 28	<NA>	39	4.5
## 29	<NA>	54	4.3
## 30	<NA>	76	4.5

##

## 1

## 2

## 3

## 4

## 5

## 6

## 7

## 8

## 9

## 10

Customers

## 11

## 12

Customers like the fit, quali

## 13

## 14

Custon

## 15

## 16

## 17

## 18 Customers like the softness, value for money, and sizing of the shirt. They mention it feels almo

## 19

## 20

## 21

## 22

## 23

## 24

## 25

```

## 26
## 27
## 28
## 29
## 30
##      Rank_by_Price Rank_by_Rating
## 1             1             23
## 2             2              7
## 3             2              7
## 4             4              7
## 5             5              7
## 6             6             16
## 7             6             23
## 8             8              7
## 9             9              7
## 10            10             23
## 11            11             30
## 12            12              4
## 13            12             16
## 14            12             27
## 15            15             16
## 16            16              7
## 17            17              4
## 18            17             16
## 19            19              2
## 20            19             16
## 21            19             29
## 22            22             27
## 23            23              2
## 24            23              4
## 25            25              1
## 26            26             16
## 27            26             16
## 28            28              7
## 29            29             23
## 30            30              7

```

Customers like the quality, sexiness, and

Customers like the softness and color of

*# The data frames displays products grouped by category, showing each product's name and description along with its rank by price and rating.*