

# **NETFLIX BINGED:**

## **AN ANALYSIS OF NETFLIX'S SUCCESS**

<https://cs171binged.com/>

Watch our screencast [here](#)

## **PROCESS BOOK**

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# Team Info

**Team Name:** Netflix and BAM!

**Team Leader:** Belinda Hu, [belindahu@college.harvard.edu](mailto:belindahu@college.harvard.edu)

**Team Member:** Michelle Hunnewell, [mhunnewell@college.harvard.edu](mailto:mhunnewell@college.harvard.edu)

**Team Member:** Adelson Aguasvivas, [aaguasvivas@college.harvard.edu](mailto:aaguasvivas@college.harvard.edu)

## Team Agreement

See the signed contract at this [link](#).

## Initial Project Brainstorm

### Background and Motivation

As avid Netflix users ourselves, we are interested in exploring the different movie and show offerings on the platform; this includes looking at the genres, formats, actors, etc. We hope to better understand how and why Netflix has become so widely used today. Our goals are to make the visualization interactive and fun. We are excited to take the websites we use on an everyday basis and explore it further.

### Related Work

Our group was interested in exploring data from the entertainment sector. Since we were all avid users of Netflix, we began to explore the possibilities of using Netflix data. We drew inspiration from Spotify Wrapped, in which they summarize a user's yearly music listening habits. This motivated us to recreate a similar visualization for Netflix data, in which we summarize Netflix's array of genres, locations, and ratings..

### Audience and Potential Questions

Our audience will be Netflix users, anyone interested in entertainment trends, and anyone who might be interested in creating a Netflix account. This audience comprises people of all age groups, as Netflix users come from all backgrounds and demographics.

- General Netflix questions
  - What are the top rated movies in different genres based on Netflix's ratings? shows?
  - What are the top rated movies in different genres based on IMDB's ratings? shows?

- Which actor is most represented on Netflix's offerings?
  - What directors have the most movies available on Netflix?
  - What are the revenue trends of Netflix?
  - What are the subscriber trends of Netflix?
  - What is the relationship between actors and directors of movies on Netflix?
- User specific questions - we are thinking of asking our CS171 classmates to send us their Netflix data via survey. Details are still being worked out for methodology.
  - What are the user's most watched shows? movies? (top 5)
  - What are the user's most watched shows/movies by month?
  - What show has the user binged the most?
  - What day of the week does the user most often watch Netflix?
  - What time of year does the user most often watch Netflix?
  - What genre is the user's most watched?
  - How do these trends compare to those of the group (of people surveyed)?
  - What's the longest consecutive period of time that a user has watched Netflix (binge period)?
  - Has the user's viewing increased during quarantine?
  - How much time has the user spent watching Netflix?
  - What are the watch patterns of the user?

## Data

We found the following datasets on Kaggle: a summary dataset of all content on Netflix, a dataset on revenue and subscribers, and a dataset on IMDB ratings. We also found data on the international presence of Netflix through Finder and Statista. We also plan to incorporate our own research into the visualizations (specifically in comparing Netflix to other platforms in terms of subscribers).

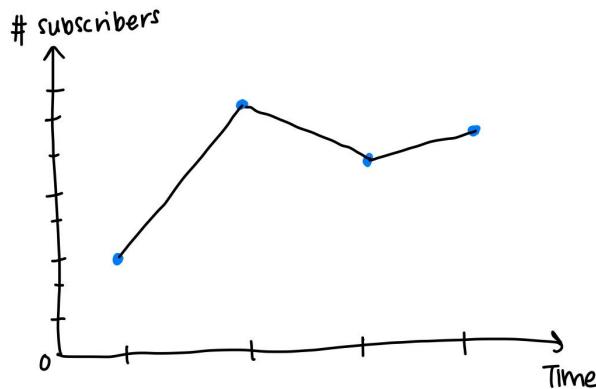
- All Netflix movies and shows (as of 2019)
  - <https://www.kaggle.com/shivamb/netflix-shows>
- Netflix subscribers and revenue (2018-2020)
  - <https://www.kaggle.com/pariaaghari/netflix2020>
- Netflix IMDB ratings (as of 2019)
  - <https://www.kaggle.com/sarahjeeze/imdbfile>
- International Presence
  - [Finder](#)
  - [Statista](#)
- Competitive Landscape - we intend to create our own dataset from our research of the major platforms (Netflix, Amazon Prime, Disney+, Hulu, HBO, etc)
- User data (via survey)

## Data Cleanup

We do not expect to have to do substantial data cleanup, as our datasets from Kaggle have been used by other users for other projects, so most of the cleaning has been done already by past users. We plan to use some of the more general netflix data, such as revenue and number of viewers, as well as viewership per movie or show. For the bubble map, we anticipate needing to create hierarchies in the data before feeding it into d3.pack.

## Sketches

### Michelle's sketches



**Question:** What are the subscribers trends of Netflix?

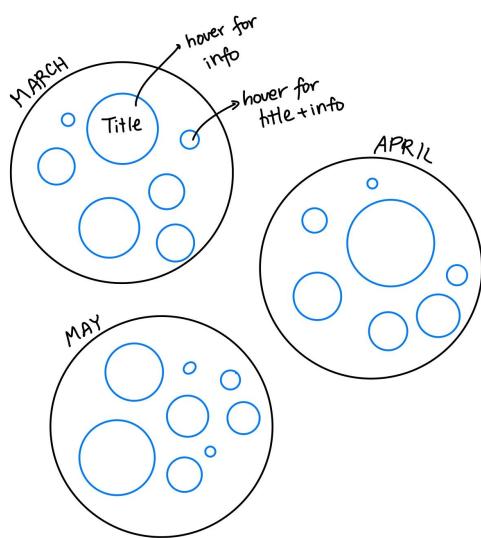
■ - watched Netflix  
□ - did not watch Netflix



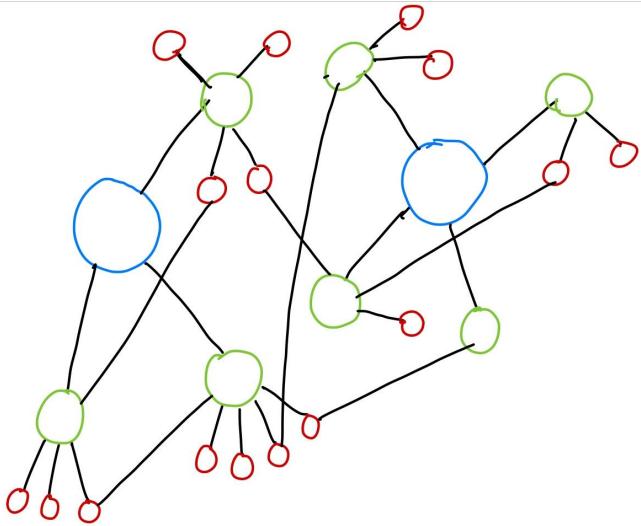
**Question:** What are the watch patterns of the user?



**Question:** How much time has the user spent watching Netflix?



**Question:** What are the user's most watched shows/movies per month? (time period is flexible, for example we can do this by year or by season)



○ - actor

\* can make more

○ - movie

detailed by

○ - director

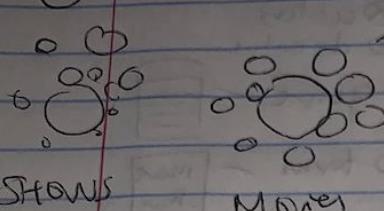
specifying meanings

for different (mk

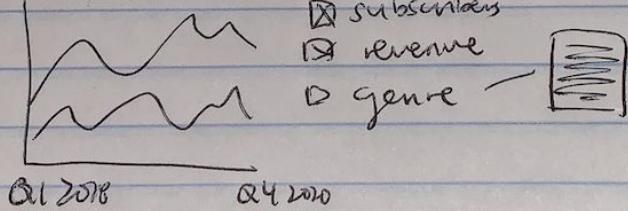
colors

**Question:** What is the relationship between actors and directors of movies available on Netflix?

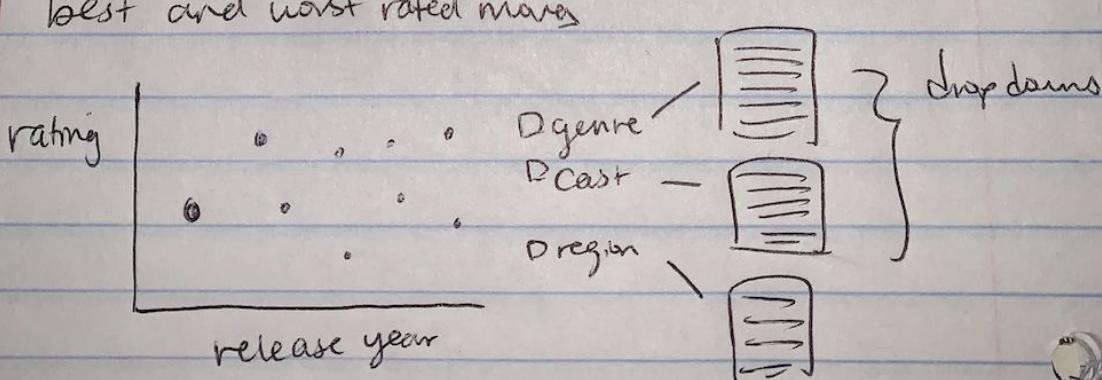
## Belinda's sketches

- CS 171 Visualization sketches
- ① 

bubbles  
for genres,  
people can  
zoom in to  
see what  
movies / shows there  
are

Shows  
Movies
  - ② word map / circles (since no country specified)  
- people can hover over region to get  
subscribers / rev. stats
  - ③ line graph to show change in subscribers / rev. over time  


Subscribers  
Revenue  
Genre

Q1 2018      Q4 2020
  - ④ best and worst rated movies  


rating

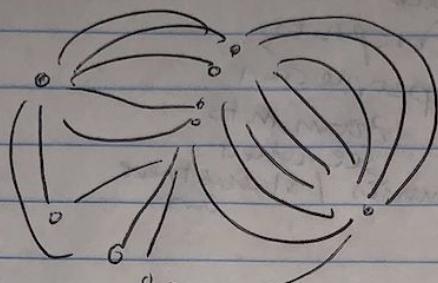
release year

Genre  
Cast  
Region

drop downs

⑤

## actors / directors network web



Individual represents  
actors / directors

⊗ actors  
D directors

D genre — 

D form — 

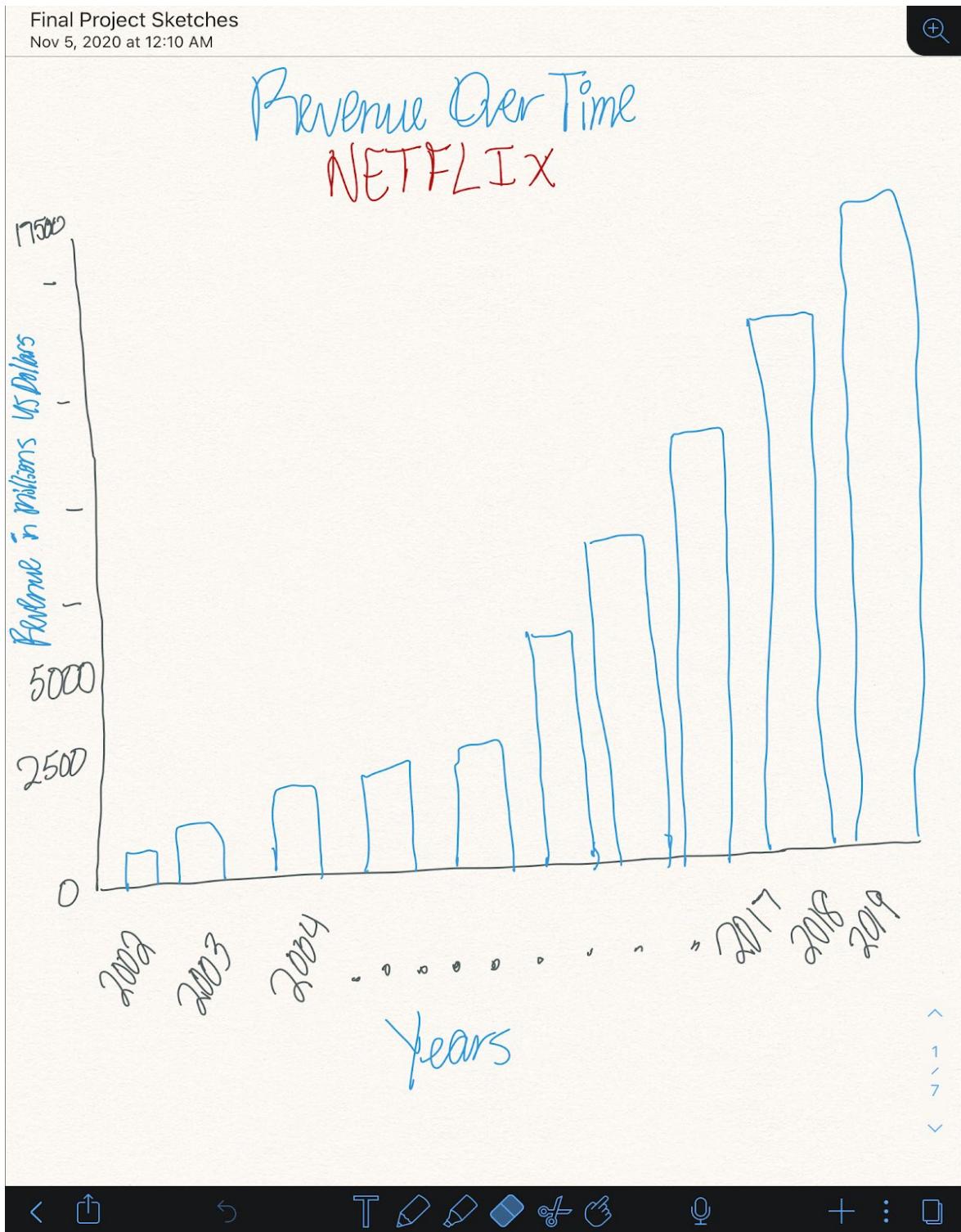
D date range



### Questions

- 1) What is the distribution of movies and shows across different genres? What are initial trends that the user can see in the data?
- 2) How is revenue and subscribers geographically dispersed across regions?
- 3) How does subscribers and revenue change over time?
- 4) How do ratings differ between format, genre, cast members, and region?
- 5) What are the relationships between actors and directors across films and shows?

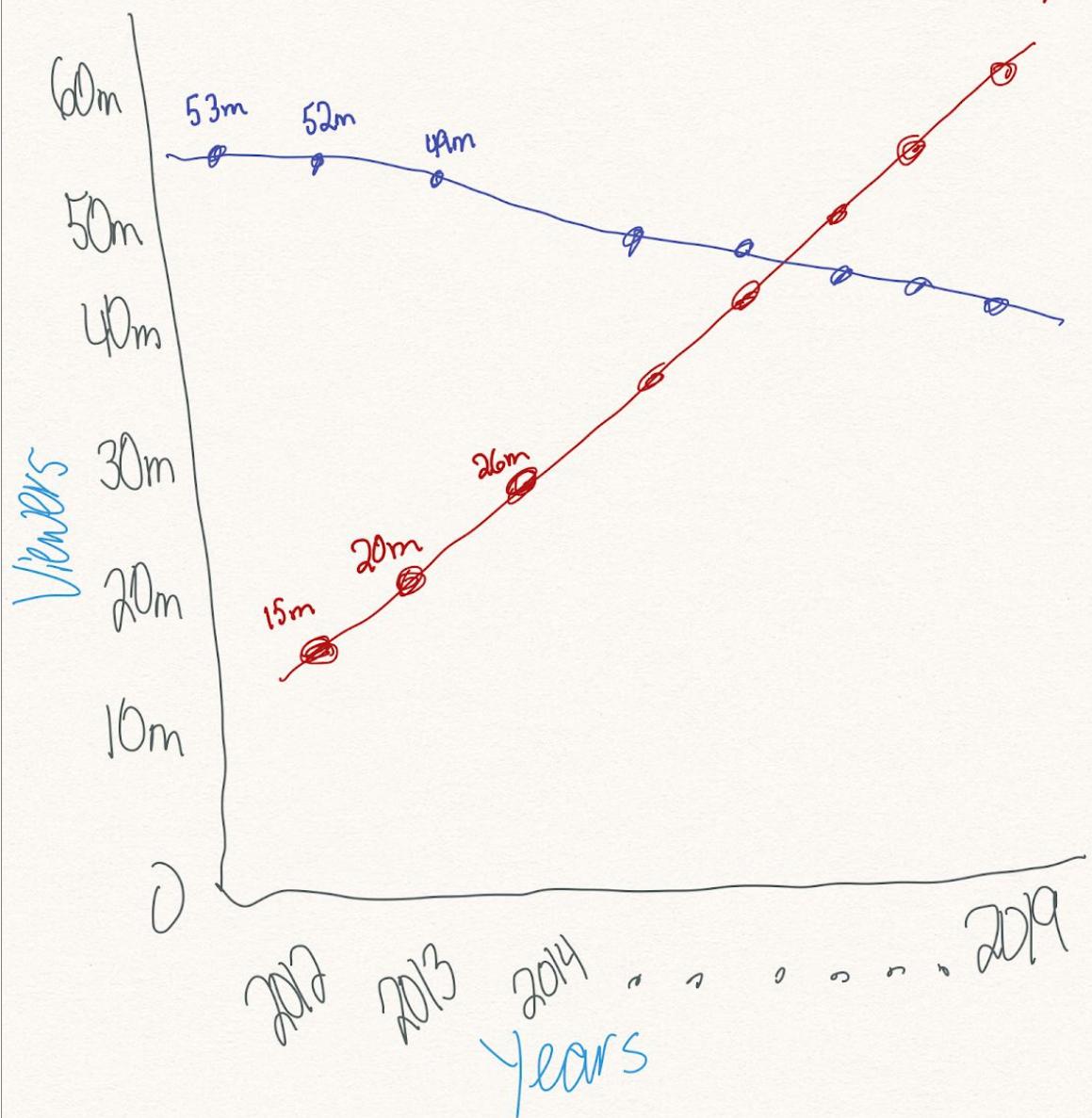
## Adelson's sketches





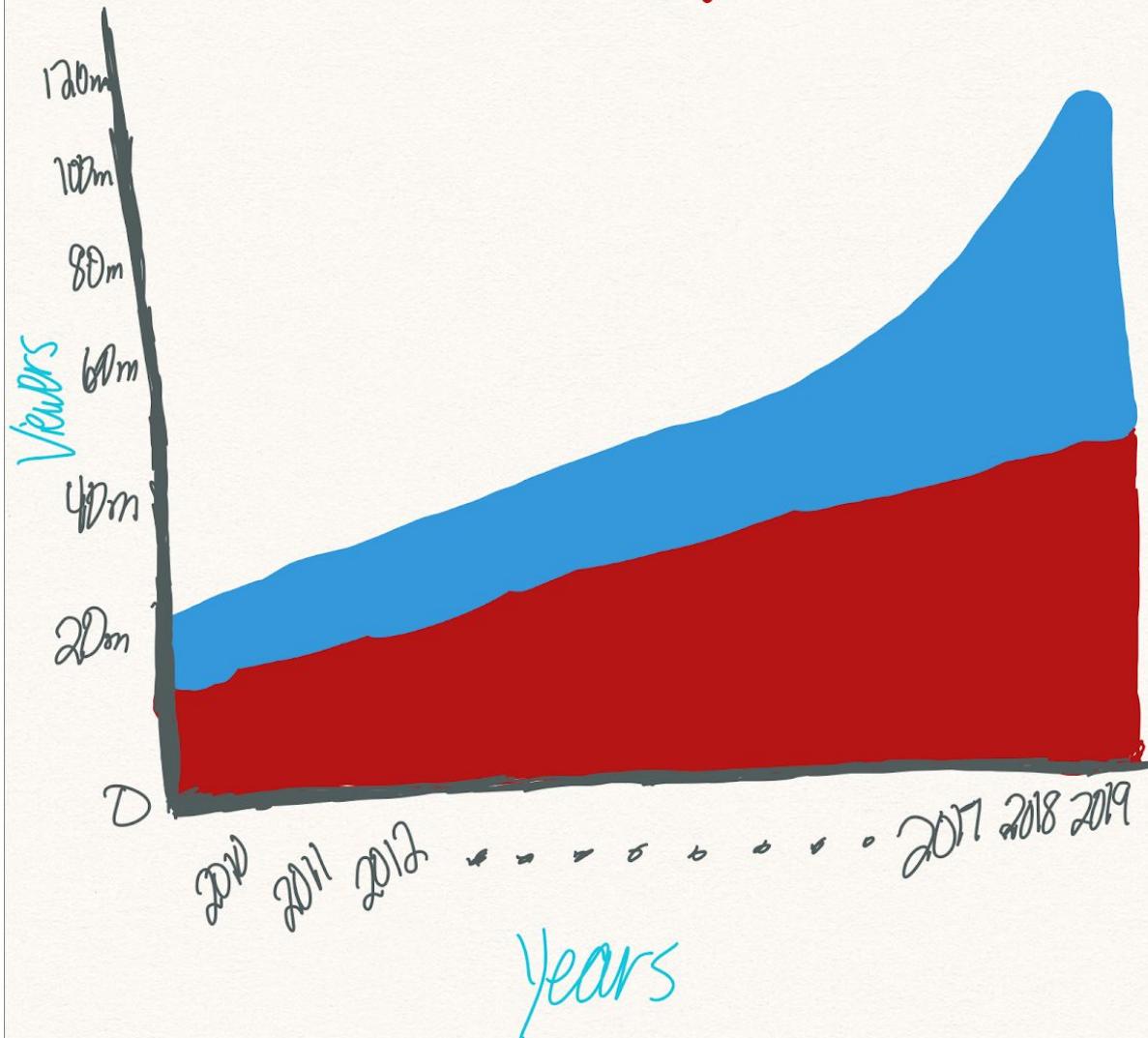
# Netflix vs Cable Providers

TV Netflix



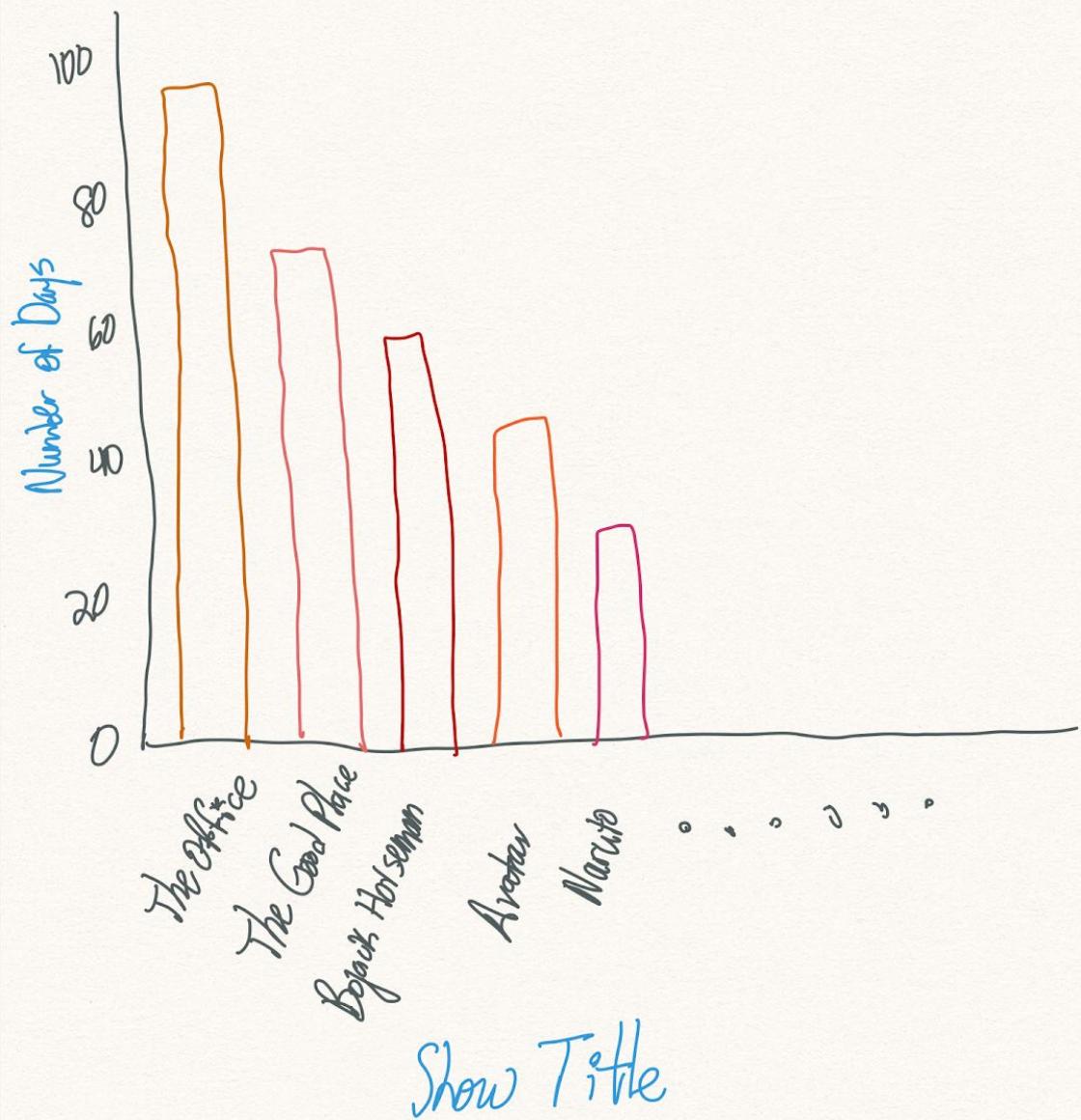
# Netflix US and International Subscriber Growth

- International
- USA





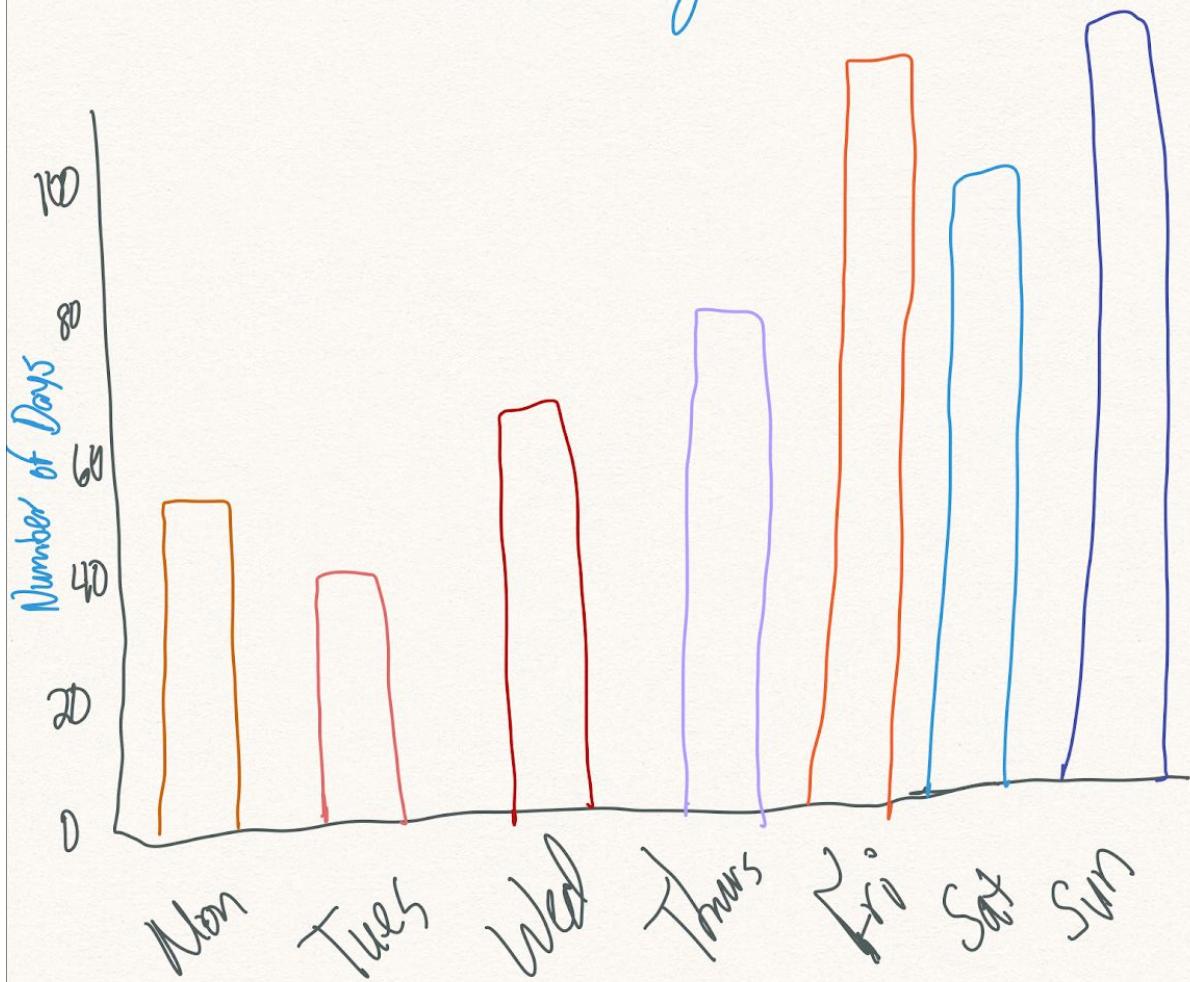
# Addison's Top 10 Shows on Netflix



^  
3 / 7  
▼



# Addison's Netflix Viewing Pattern per Day



4  
7



# Abelson's Top 10 Shows

#1

Picture  
of

show cover

"The Office (2006)"

← Prev

Next →

^  
5 / 7  
▼

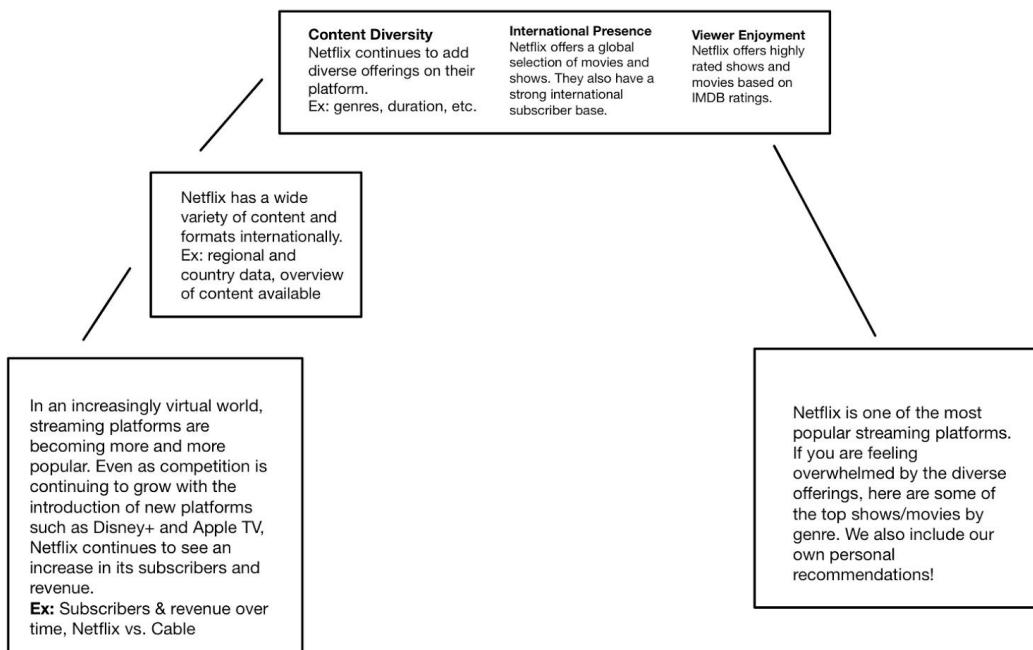


### **Adelson's Questions:**

1. How has Netflix's revenue changed over time?
2. How does Netflix's popularity compare to cable providers over time?
3. How has Netflix grown in the US and Internationally over time?
4. What are the user's top 10 shows on Netflix?
5. What are the user's Netflix Viewing Patterns per Day?
6. What are the user's top 10 shows visually?

## **Storyboard**

After creating our own sketches, we put our heads together to create a story arc. We realized that there were three main reasons why Netflix was popular - its content diversity, its huge international presence, and its high ratings. These three factors enabled it to grow in popularity both in the US and abroad. We made that our "climax" and built up to it with an intro and background info. Then, we concluded with our own recommendations for someone who might want to make their own Netflix account.



## **Prototype v1**

### BALSAMIQ DESIGN

In our planning meetings, we used BALSAMIQ to visually draft out our design and see how each visualization would connect. We based our coding off of this design.

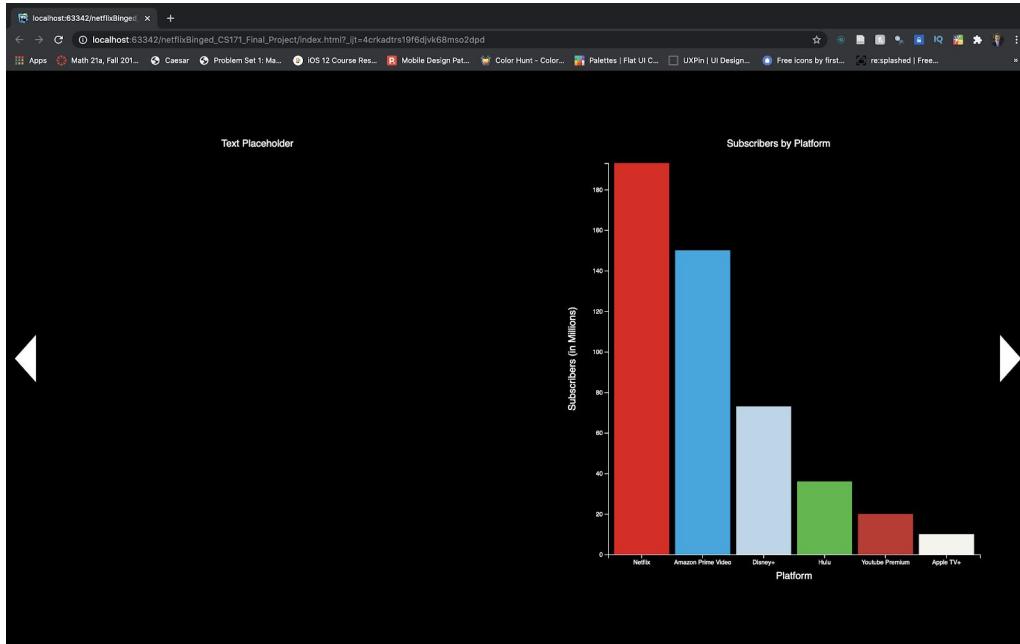
## Intended Message

We designed our prototype to demonstrate the three main reasons why Netflix is so popular: content diversity, high ratings, and international viewership. We decided to end the visualization with recommendations for the user when they make their own accounts.

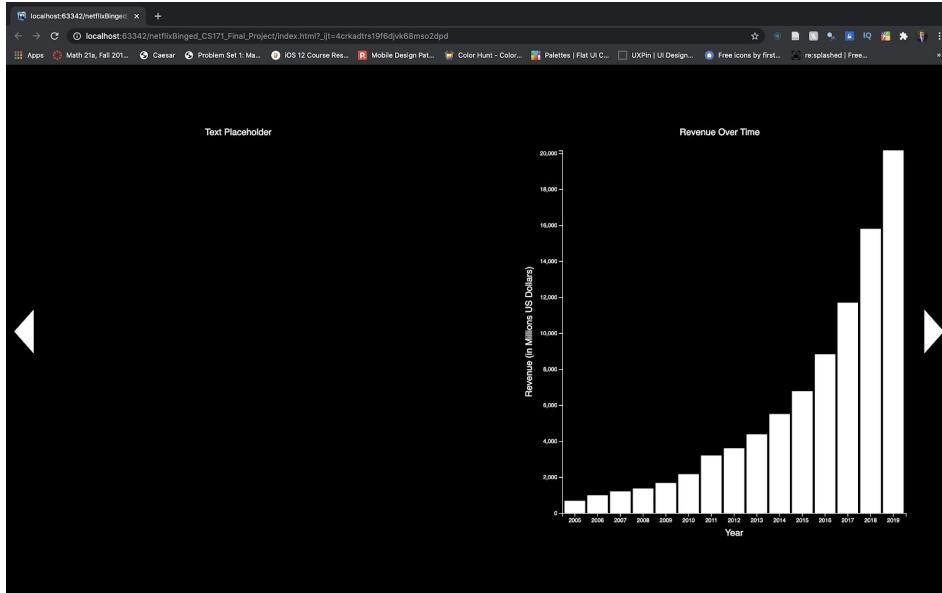
Below is our coding progress as of November 15, 2020. We created a general HTML layout using fullpage.js, emulating the Netflix aesthetic of a black background and red font.

## Coding Progress

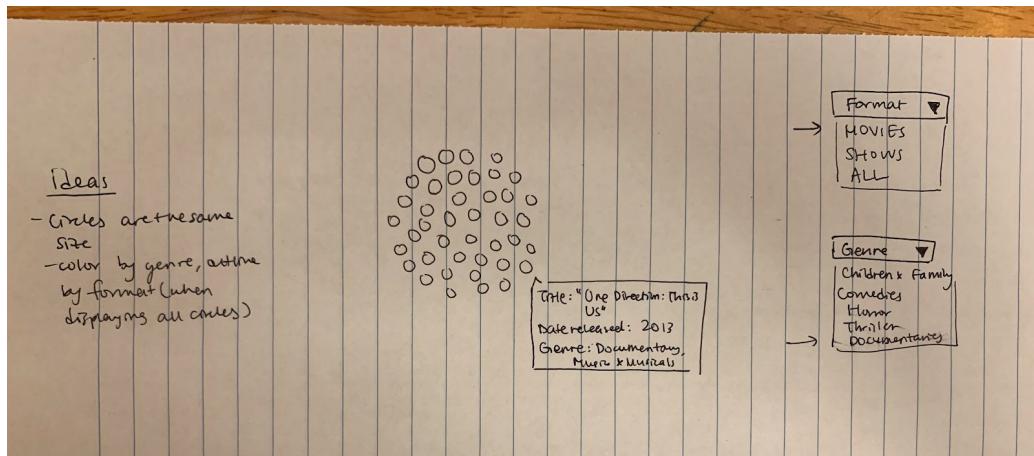
### Subscribers by Platform



## Revenue Over Time



## Design for Bubble Map of All Netflix Listings



Currently, our attempts live in bubble.js but are commented out as we determine the best approach. Here are our ideas so far:

- Bubble chart displaying all listings on Netflix as circles
- Filter by format (movie, show) and genre (ie: comedies, documentaries)
  - Some listings have more than one genre so will show up in each selection
- Circles can be colored by their primary genre and have outlines based on what format they are in (movie or show)
- Legend and tooltip to be added

## TF Feedback

- Thoughts on user data? Is it feasible?
  - Low response rates ~ 15%
  - Send out to friends instead of class
- What does generating a “novel visualization” mean?
- How can we show that Netflix is as good as we’re making it out to be?
  - How to make claim w/o needing to get extra data
- Important to not lose sight of how viz go together
- Network viz
  - D3 force directed layouts or adjacency matrix
- Circle viz
  - Pack circle hierarchy
  - D3 pack layout
- **Do not neglect overall layout of page - make skeleton of HTML page and styles**
  - Insert placeholder into skeleton
  - Have one person take the lead to come up with HTML/CSS
  - Don’t wait too long to do the scroller/stepper - do before visualizations
    - Fullpage.js - Ben used - <https://alvarotriago.com/fullPage/#page3>
    - Scrollama.js - steep learning curve, flexibility
    - Graphscroll.js

## Prototype v2

### To-Do (as of 11/16):

- [Michelle]
  - Parse data
    - Create arrays of comma separated countries and genres
  - Viewer Enjoyment x2
    - Slider
    - Rectangles/circles you hover over or click on to see rating for genre and top rated shows/movies
- [Adelson, Belinda] All text
- [Belinda]
  - Bubble Map
    - Assign super genres
    - Nest / pack data
- [Adelson]
  - Set up International presence, with map and table

- Web Scrape for Netflix Movies and TV Shows Numbers
- Set up acknowledgements

## Setting Up Bubble Chart

Bubble chart resources:

- [Bubble chart](#)
- [D3 Layout Bubble](#)
- [Clustered Force Layout Bubbles](#)
- [Circle Packing](#)
- [Zoomable Circle Packing](#)

### Super Genres

We set up super genres to make the bubble chart easier to create. Netflix had 42 different genres across movies and TV shows, which would have made a bubble map bulky to view. Hence, we categorized the genres into more general super genres. Because many listings had multiple genres, we sorted by the first genre in each list.

#### Family / kids

0: "Children & Family Movies"  
 3: "Kids' TV"  
 29: "Teen TV Shows"  
 39: "Sports Movies"

#### Comedy

"Comedies"  
 "Stand-Up Comedy"  
 "TV Comedies"  
 "Stand-Up Comedy & Talk Shows"

#### International

"International TV Shows"  
 "Spanish-Language TV Shows"  
 "International Movies"  
 "British TV Shows"  
 "Korean TV Shows"  
 "Anime Features"  
 "Anime Series"

#### Drama

["Dramas"](#)  
["TV Dramas"](#)  
["Crime TV Shows"](#)

#### Romance

["Romantic TV Shows"](#)  
["Romantic Movies"](#)

#### Documentaries

["Docuseries"](#)  
["Documentaries"](#)  
["Science & Nature TV"](#)

#### Reality

["Reality TV"](#)

#### Cultural

["Cult Movies"](#)  
["Independent Movies"](#)  
["Faith & Spirituality"](#)  
["LGBTQ Movies"](#)

#### Musical

["Music & Musicals"](#)

#### Classic

["Classic Movies"](#)  
["Classic & Cult TV"](#)

#### Horror / thrillers / mysteries

["Horror Movies"](#)  
["TV Thrillers"](#)  
["TV Mysteries"](#)  
["Thrillers"](#)  
["TV Horror"](#)

#### Action

["Action & Adventure"](#)  
["TV Action & Adventure"](#)

Sci Fi / Fantasy

"Sci-Fi & Fantasy"

"TV Sci-Fi & Fantasy"

Miscellaneous

"Movies"

"TV Shows"

## Testing

Pre-test screenshots:

Landing Page



Background page

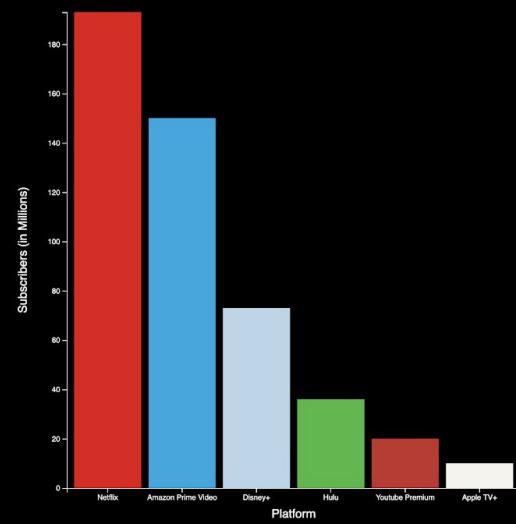
## BACKGROUND

In an increasingly virtual world, streaming platforms are becoming more and more popular. Netflix began offering movie streaming to its subscribers in 2007 and promptly became one of the world's largest streaming platforms. In 2010, Netflix converted into a streaming-only provider and began expanding outside of the United States. Today, Netflix has not only become the go-to streaming platform, but a widespread cultural norm.

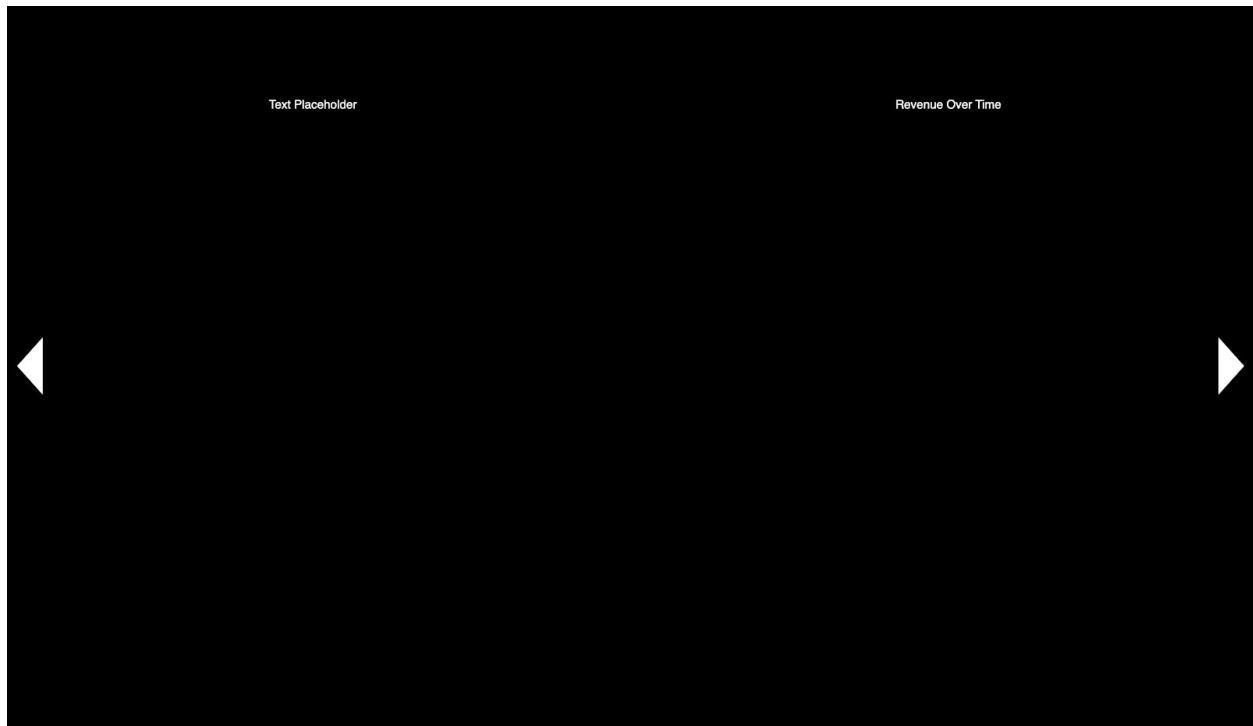
### Subscribers by platform

Text Placeholder

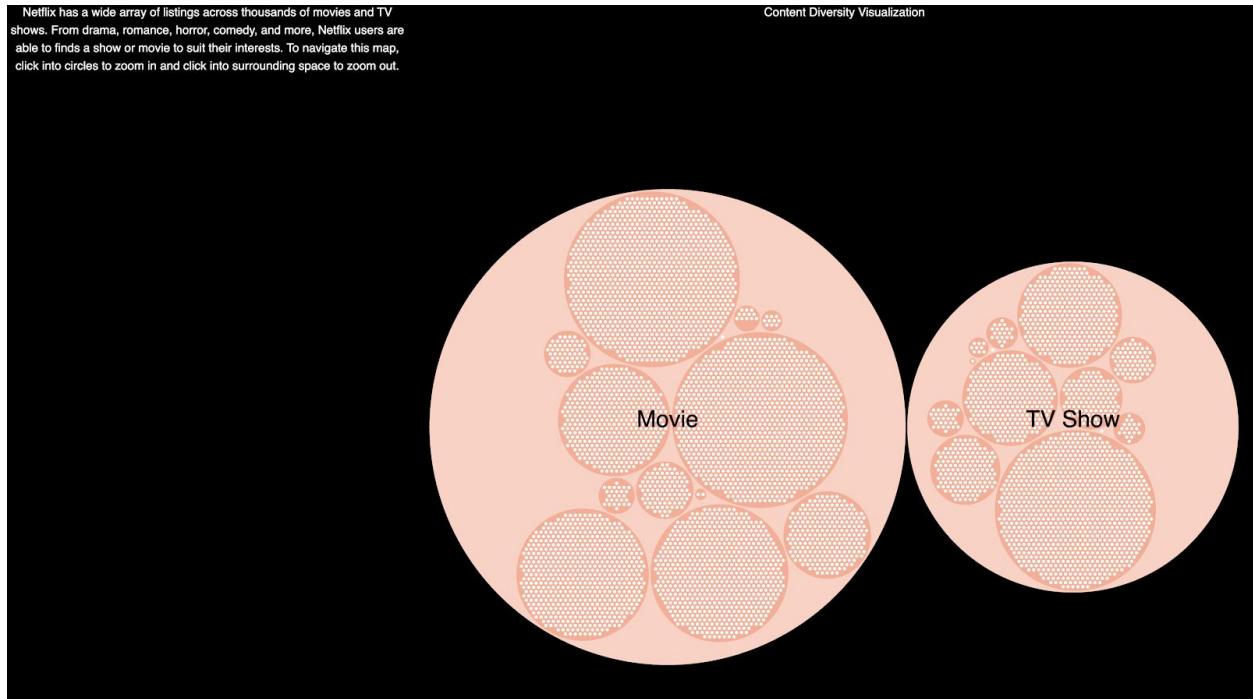
Subscribers by Platform



## Revenue over time



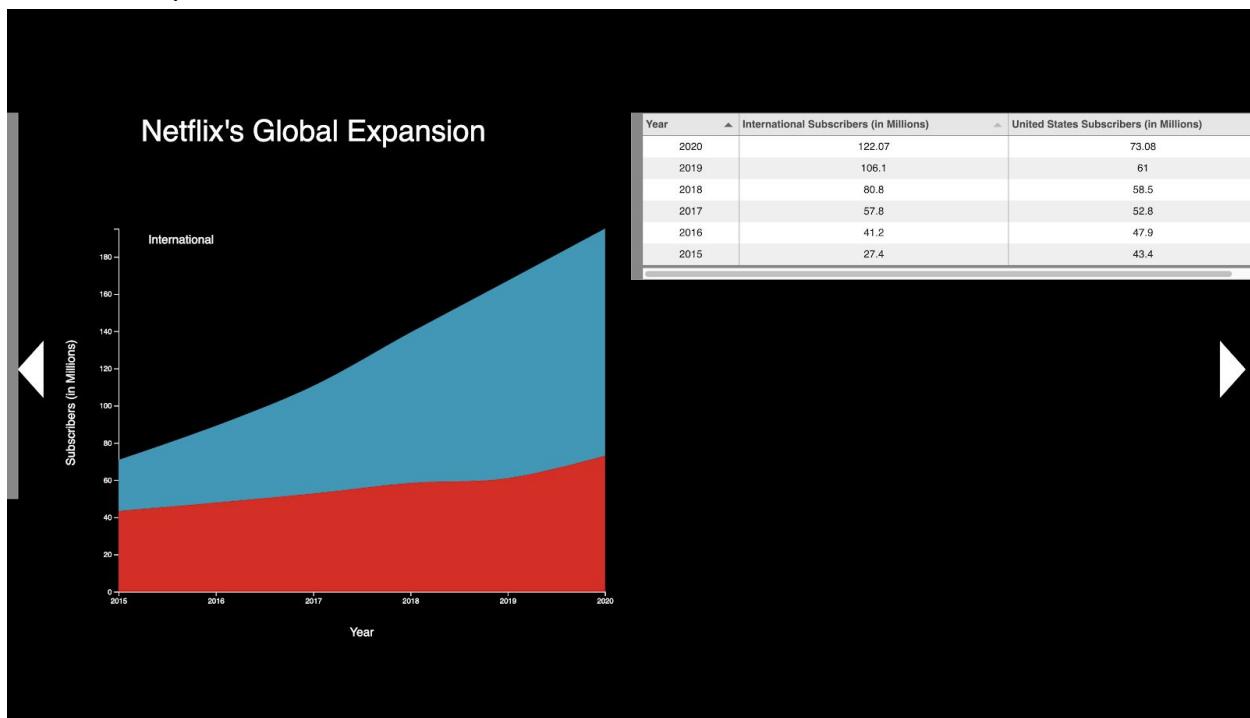
## Content diversity - bubble map



## International presence - map



## International presence - stacked area chart



## Viewer enjoyment

# VIEWER ENJOYMENT

What's the average IMDB rating (scored out of 10) of Netflix's movies?  
Take a guess using the slider!



Your guess is an average rating of 0.00.

69% are rated 6 or higher on IMDB.



What's the average IMDB rating (scored out of 10) of Netflix's TV shows?  
Take a guess using the slider!

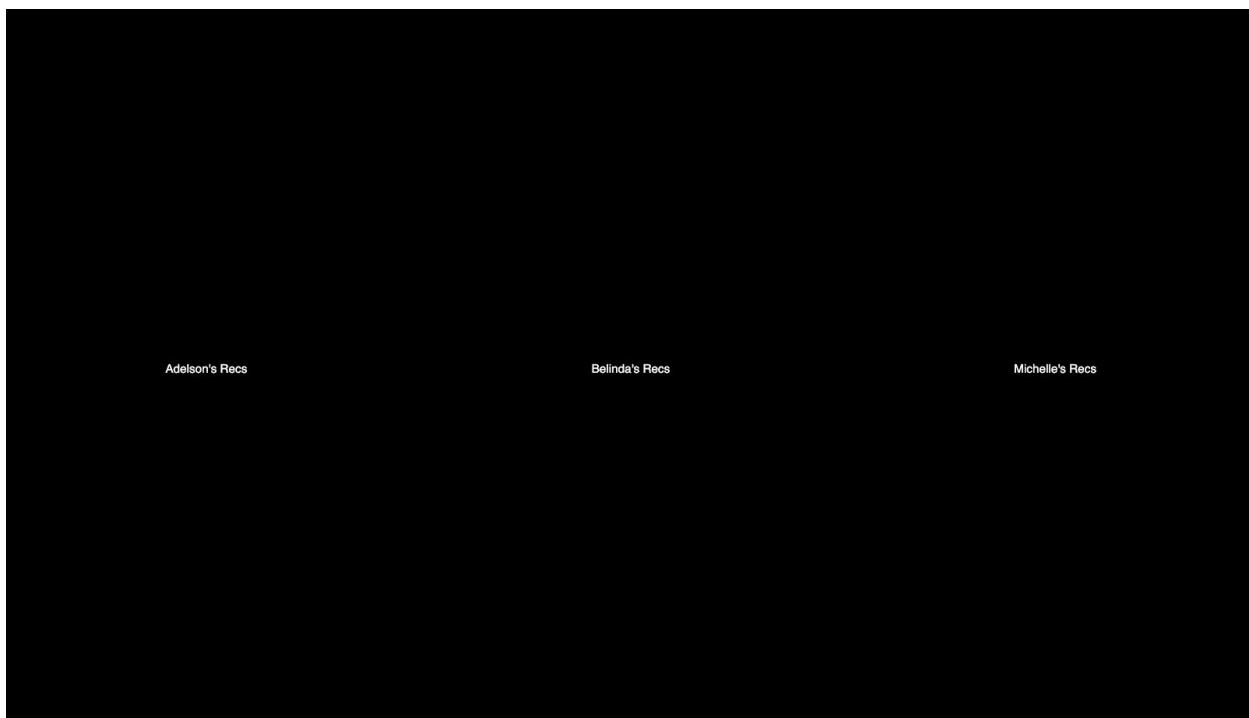


Your guess is an average rating of 0.00.

83% are rated 6 or higher on IMDB.



## Recommendations



Adelson's Recs

Belinda's Recs

Michelle's Recs

## Acknowledgements

Resources/Acknowledgements

## Test 1:

**Tester Name:** Bianca Cordazzo

**Tester Email:** [be\\_cordazzovargas@college.harvard.edu](mailto:be_cordazzovargas@college.harvard.edu)

**Team Member:** Belinda Hu

### General Observations from the think-aloud study:

- Intro page is cut off on the sides?
- Kind of hard to scroll (perhaps with remote controlling) - easy to scroll all the way down by accident
- Able to figure out generally
- Likes aesthetics of the page
- Adjust coloring - set a color scale
- Lateral scrolling?

### What does the tester like about your data story?

- Intro
  - Liked coloring of first bar chart
- Bubble
  - Able to figure out
- Viewer enjoyment

- Liked the interactivity

### **What improvements does the tester point out?**

- Intro
  - Make sure text isn't cut off
- Bubble
  - No text - add labels
  - Insert small text
  - Text disappears and can be hard to read
- Map
  - Need to show that you can press next
  - Center the map and table
  - Put the title on top
  - Clarify where the movies are coming from / topic or if the movies are available in a country
  - Scope of the map → Leaflet map instead?
  - Clarify numbers on map
    - Make sure they correlate to table
  - Add text explaining listings available in country
  - Update world map to show numbers in table
  - Clarify tooltip on map
- Stacked area chart
  - Center the table
  - Add text
  - Add a legend to explain stacked area chart
- Viewer enjoyment
  - Show vis after checking
  - Tooltip is hard because they are so close to each other

### **Was the intended key message clear to the tester? Why or why not?**

- yes

### **Did the tester get your next steps or call to action? Why or why not?**

- Not, since we didn't put them in
- Try new shows?
- "Netflix is a one-stop shop for entertainment - there's no shortage of options. So here are a few to get you started."

## Test 2:

**Tester Name:** Lizzy Yang

**Tester Email:** [elizabethyang@college.harvard.edu](mailto:elizabethyang@college.harvard.edu)

**Team Member:** Michelle Hunnewell

### **General Observations from the think-aloud study:**

- eye-catching title page
- had difficulty scrolling on the website (could have been due to Zoom remote control lagging)
- bar graphs in the background section is clear
- understood the bubble map to represent different listings (just need to add labels - WIP)
- user missed the slide arrows in the international presence section (hidden bc of the overlay with the table)

### **What does the tester like about your data story**

- understood the main message to explain the dominance of Netflix

### **What improvements does the tester point out?**

- improve the map legend in the international presence section (WIP)
  - user was unsure what the colors / values corresponded to
  - could improve information displayed in the tooltip

### **Was the intended key message clear to the tester? Why or why not?**

- Yes, the user understood the main message

### **Did the tester get your next steps or call to action? Why or why not?**

- no → unclear what the next steps are (we hadn't filled out our rec's section yet which explains why the user did not get the next steps portion)
- since our main message is to explain the dominance of Netflix and it is already a popular site, the user is unsure what we could use as our next steps
  - recommend using the platform to users? already a popular site

## Test 3:

**Tester Name:** Annabelle Paterson

**Tester Email:** [annabellepaterson@college.harvard.edu](mailto:annabellepaterson@college.harvard.edu)

**Team Member:** Adelson Aguasvivas

**General Observations from the think-aloud study:**

- Zoom made it hard to scroll through the page, but seems that it works smoothly after sending the files over email and having everything locally
- The flow of the story and the visualizations make sense, some are really cool and informative
- The bar charts are aesthetically pleasing due to their color and that they tie well with the black background
- In the map page, the arrows to scroll through are hard to see, she suggests either changing color of arrows, or centering everything so that the arrows are visible
- Overall, really liked everything and thought it was intuitive and interesting to scroll through
- She really liked the Netflix sound when you look at the first bar chart
- Thinks that finishing up the text will make everything even better and more straight forward

**What does the tester like about your data story?**

- Flow of the story
- The wide range of visualizations
- The kinds of topics the visualizations touch on
- The bar chart colors and placement
- The Netflix sound and Netflix aesthetic feel of the page

**What improvements does the tester point out?**

- Finish up adding text and labels to tie everything together
- Some tooltip information is missing even though it is displayed in the tables
- On the map page, make sure things are centered and visible because the arrows are hard to see
- Add titles and more clear separators as you scroll down
  - Viewer enjoyment visualization did a good job doing this
- Add legends, fix spacing and focus on the smaller details

**Was the intended key message clear to the tester? Why or why not?**

- Yes, everything made sense, the main focus should be on wrapping up visualizations, polishing and adding details

**Did the tester get your next steps or call to action? Why or why not?**

- Got overall message that Netflix is successful, and is looking forward to the last visualization which will be recommendations

## To-Do (Week of 11/23):

### Belinda

- Bubble chart
  - Fix text there
  - Add tooltip

### Adelson

- Continue working on map
- Map Tooltip
- Barchart tooltips

### Michelle

- fix tooltip in Viewer Enjoyment
- finalize Viewer Enjoyment section
- work on recommendations page

## Final Wrap Up Schedule:

- Nov. 29: Group Meeting
  - finalize color scheme
  - conduct another mini-test of the website
- Dec. 1: Tweaks and functional code completed; begin styling
- Dec. 2: Group Meeting
  - discuss styling to ensure uniformity
  - write out final text for the data story
- Dec. 3: Group Meeting
  - conduct another mini-test of the updated website
  - ensure all requirements are met
- Dec. 4: Group Meeting
  - complete and standardize styling
  - ensure complete functionality
  - discuss any final tweaks
  - begin prepping for submission
- Dec. 6: Group Meeting
  - host website
  - write READ ME file
  - record screencast

- complete peer assessments
- clean up, comment, and organize code

## Final Color Scheme

Netflix Red: rgb (223, 5, 26)

Dark Red: rgb (119, 11, 15)

Gray: rgb (112, 113, 113)

Black

White

## Drafted Website Text:

Below are our drafts for the text to populate each panel on the web page.

### [Michelle] Background

Source: <https://interestingengineering.com/the-fascinating-history-of-netflix>

In an increasingly virtual world, streaming platforms for movies and TV shows have become more and more popular amongst consumers. People have opted to stream from their personal devices instead of watching entertainment on live cable or in theaters.

Since the year after its inception in 1997, Netflix offered online movie rentals in which customers would receive their DVD in the mail. However, by the end of 2010, Netflix users were streaming their entertainment at a far greater pace than those renting, and Netflix became a solely online streaming platform. As it developed its streaming services and expanded outside of the United States, Netflix has become a staple of modern entertainment. Not only is it the go-to platform for most users, but Netflix has become a cultural icon for current generations.

Despite increasing competition as rivals enter the streaming space, Netflix continues to come out on top. Let's analyze Netflix's astounding success in an increasingly competitive landscape.

### [Adelson] Revenue

Netflix has grown from a small privately owned online movie rental business, to becoming publicly traded and a multi-million dollar company, to now being a household name making billions of dollars in revenue every year, still seeing exponential growth. Netflix's successful model and transition, survived a recession, and revolutionized the entertainment industry all together. With the world becoming more and more digitized amidst a pandemic, Netflix can expect to continue its yearly growth in subscribers and revenue.

### [Adelson] Subscriber

Netflix is one of the pioneers in the online streaming space, realizing earlier than most that a transition into a solely digital and tech sphere would outlast all of their competitors or make those competitors follow in their footsteps. They have evolved and had huge success in doing so. Other huge companies like Amazon and Disney have been inspired by Netflix's model, and those that did not evolve, like Blockbuster, have almost completely ceased to exist or gone bankrupt. Netflix remains atop of the number of subscribers list by a huge margin, for several reasons, namely their content diversity, huge number of listings, and strong international presence.

### [Belinda] Content Diversity

Netflix has a wide array of listings across 6000+ movies and TV shows. From drama, romance, horror, comedy, and more, Netflix users are able to find a show or movie to suit their interests.

To navigate this map, click into circles to zoom in and hover on the white circles to learn more about each listing. To zoom out, click into surrounding space to zoom out. Each listing has its own set of subgenres. Movies are on the left, TV shows are on the right.

### [Michelle] Viewer Enjoyment

Not only does Netflix have a wide array of movies and shows, it also provides top-quality offerings that viewers enjoy. Netflix's catalog includes highly-rated movies on IMDB, which uses a rating scale of 1-10.

### [Adelson] International Presence

Netflix has seen huge growth internationally in the past few years. If you look at the map, Netflix is present in what seems like every part of the world, with very few exceptions. Netflix is available in 212 countries and territories, with a wide range of shows and movies available in each. You can hover over an individual country or explore the table to see the numbers, but each country has hundreds, if not thousands of listings available. Another huge change has been in the number of international subscribers compared to the number of subscribers in the United States. In 2015, the US had 43.3 million subscribers, while there were only 27.4 million subscribers in the rest of the world. Just five years later, in 2020, there are 73.08 million subscribers in the US, and 122.07 million subscribers in the rest of the world, demonstrating the scale at which Netflix has been able to expand globally.

### [Michelle] Conclusion

The diverse offerings of top-rated movies for a global audience has kept Netflix as the most successful, fan-favorite streaming service. Even as multiple new platforms have emerged in the industry and online streaming has surged in popularity during the 2020 quarantine, Netflix continues to stand out amongst its competitors. Now that you're convinced to join Netflix, check out our recommendations below and get binging!

## Recommendations

- no explanation needed -

## [Belinda] References / Acknowledgements

This project would not have been possible without the support of our amazing TF, Ben Levy, as well as the rest of the CS171 teaching staff. We are grateful for all the help and expertise we've received over the semester.

Our datasets are as follows:

- Netflix movies and shows
  - <https://www.kaggle.com/shivamb/netflix-shows>
- Netflix subscribers and revenue
  - <https://www.kaggle.com/pariaaghari/netflix2020>
- Netflix IMDB ratings
  - <https://www.kaggle.com/sarahjeeze/imdbfile>
- International Presence
  - [Finder](#)
  - [Statista](#)

## Final Week and Submission:

Website Link: <https://cs171binged.com/>

## To-Do's (as of 12/3/20):

- Color scale
- Call to action
- Read Me
- General Styling
- Clean up process book
- Record screencast
- Standardize text and tooltips

- Comment code, delete random comments

## Styling To Dos (as of 12/4/20):

### *All*

- Finish up text, pick a color - h4 helvetica white
- Change background color
- Coordinate text sizing - h1, h2, p, h3, h4 (all same font, size, margin, centering)
- Insert padding - bar charts, bubble, map
- Unequal padding for headers
- Send on our watchlist to michelle
- Clean up code

### *Adelson*

- Readme
- Potentially style tooltip for map

### *Belinda*

- Make view box smaller for page load for bubble
- Bubble link to website
- Shift acknowledgements up
  - Make links red
- Outline of circles on mouseout
- Discuss outlines (recs)

### *Michelle*

- Bigger squares for viewer enjoyment?
- Center ui sliders
- Link recs to website using window.open(url)

## To Dos (as of 12/5/20):

### *All*

- Insert screenshot of updates
- Write final thoughts

### *Adelson*

- Center text
- Padding for bar charts and tables
- Tooltip for area chart goes away on mouseout
- Take off country name in map tooltip
- Center table?
- Font change for tooltip? Or make top bold

### *Belinda*

- Zoom cuts off some small circles
- Change screencast

*Michelle*

- Line on table for viewer enjoyment

**After screencast**

- **Finish process book**
- **Finish readme**
- **Edit and upload video**
- **Fix linking issue**

## Final Screenshots

Landing Page



Background slides

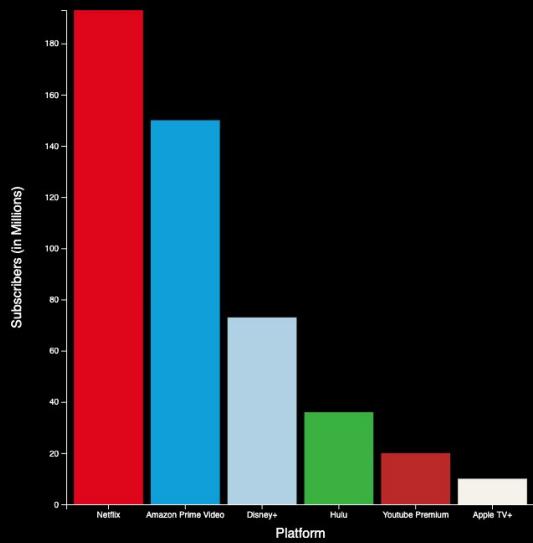
## BACKGROUND

In an increasingly virtual world, streaming platforms for movies and TV shows have become more and more popular amongst consumers. People have opted to stream from their personal devices instead of watching entertainment on live cable or in theaters. Since the year after its inception in 1997, Netflix offered online movie rentals in which customers would receive their DVD in the mail. However, by the end of 2010, Netflix users were streaming their entertainment at a far greater pace than those renting, and Netflix became a solely online streaming platform. As it developed its streaming services and expanded outside of the United States, Netflix has become a staple of modern entertainment. Not only is it the go-to platform for most users, but Netflix has become a cultural icon for current generations. Despite increasing competition as rivals enter the streaming space, Netflix continues to come out on top. Let's analyze Netflix's astounding success in an increasingly competitive landscape.

## SUBSCRIBERS BY PLATFORM

Netflix is the pioneer in the online streaming space, realizing earlier than most that a transition into a solely digital commodity would outlast all of their competitors, forcing other companies to follow in their footsteps. They have evolved and had huge success in doing so. Other huge companies like Amazon and Disney have been inspired by Netflix and its business model, and those that did not evolve, like Blockbuster, have almost completely ceased to exist or gone bankrupt.

As of 2020, Netflix remains atop of the number of subscribers list by a huge margin, for several reasons, namely their huge number of listings, content diversity, high ratings, and strong international presence.

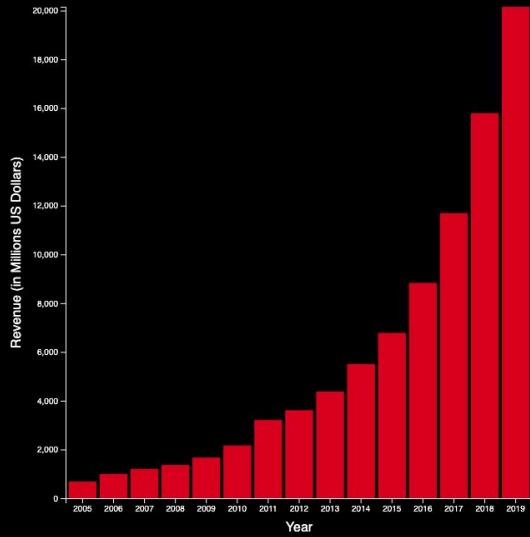


## NETFLIX'S REVENUE OVER TIME

From the late 1990s to 2002, Netflix grew from a small privately owned online movie rental business to a publicly traded multi-million dollar company. Now, it is a household name making billions of dollars in revenue every year while still seeing exponential growth.

Netflix continuously evolved its successful model, survived a recession, and emerged as a revolutionizing force in the entertainment industry. With the world becoming more and more digitized amidst a pandemic, Netflix can expect to continue its yearly growth in subscribers and revenue.

Hover over the bar chart on the right to see the exact numbers corresponding to each year during this remarkable period of growth for the company.

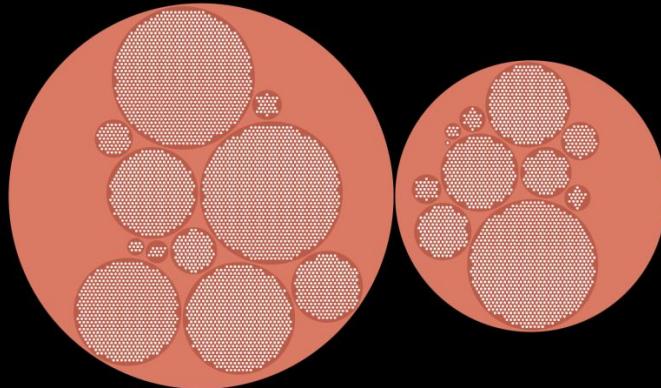


### 1. Content Diversity

#### NETFLIX LISTINGS

Netflix has a wide array of listings across 6000+ movies and TV shows (as of 2019). Since then, Netflix's offerings have only grown. From drama, romance, horror, comedy, and more, Netflix users are able to find a show or movie to suit their interests.

Click to zoom in and out. Each listing has its own set of subgenres. Click the white circles to view more information about the listing on the Netflix website.



### 2. Viewer Enjoyment

## VIEWER ENJOYMENT

Not only does Netflix have a wide array of movies and shows, it also provides top-quality offerings that viewers enjoy. Netflix's catalog includes highly-rated movies on IMDB, which uses a rating scale of 1-10.

### TAKE A GUESS!

What's the average IMDB rating of Netflix's movies?

Your guess is an average rating of 0.00.

Check

What's the average IMDB rating of Netflix's TV shows?

Your guess is an average rating of 0.00.

Check

## MOVIES

**69% are rated 6 or higher on IMDB.**

Click on a square to find out more info.



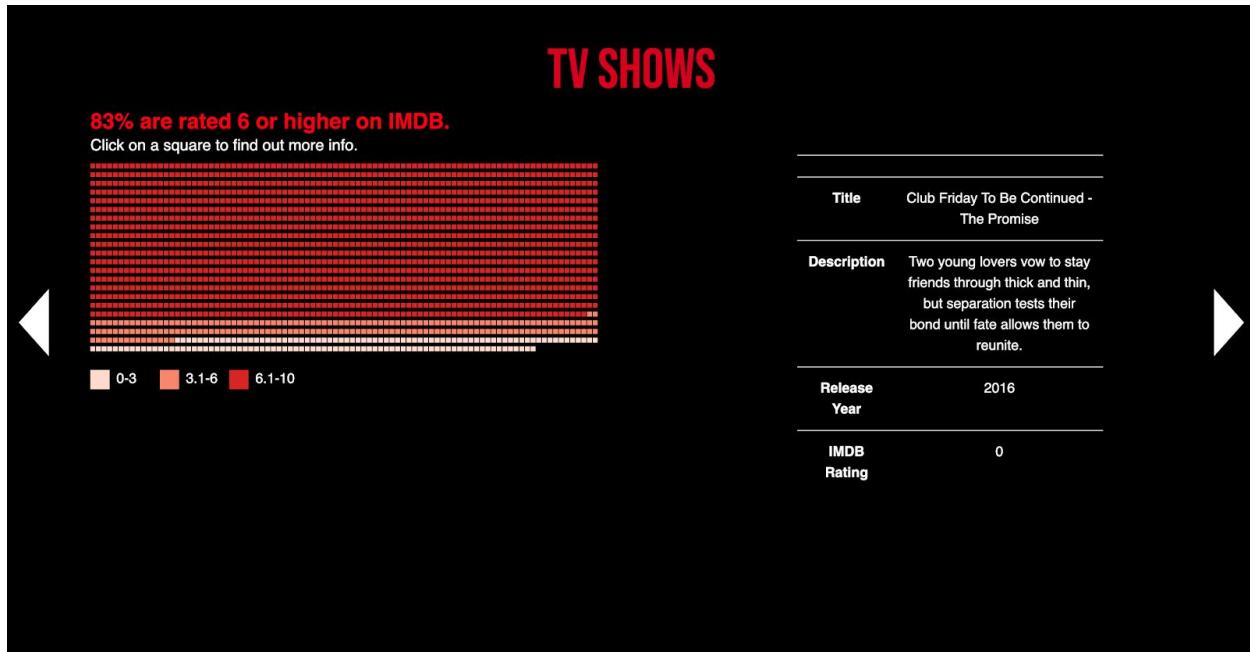
■ 0-3 ■ 3.1-6 ■ 6.1-10

Title Scott Pilgrim vs. the World

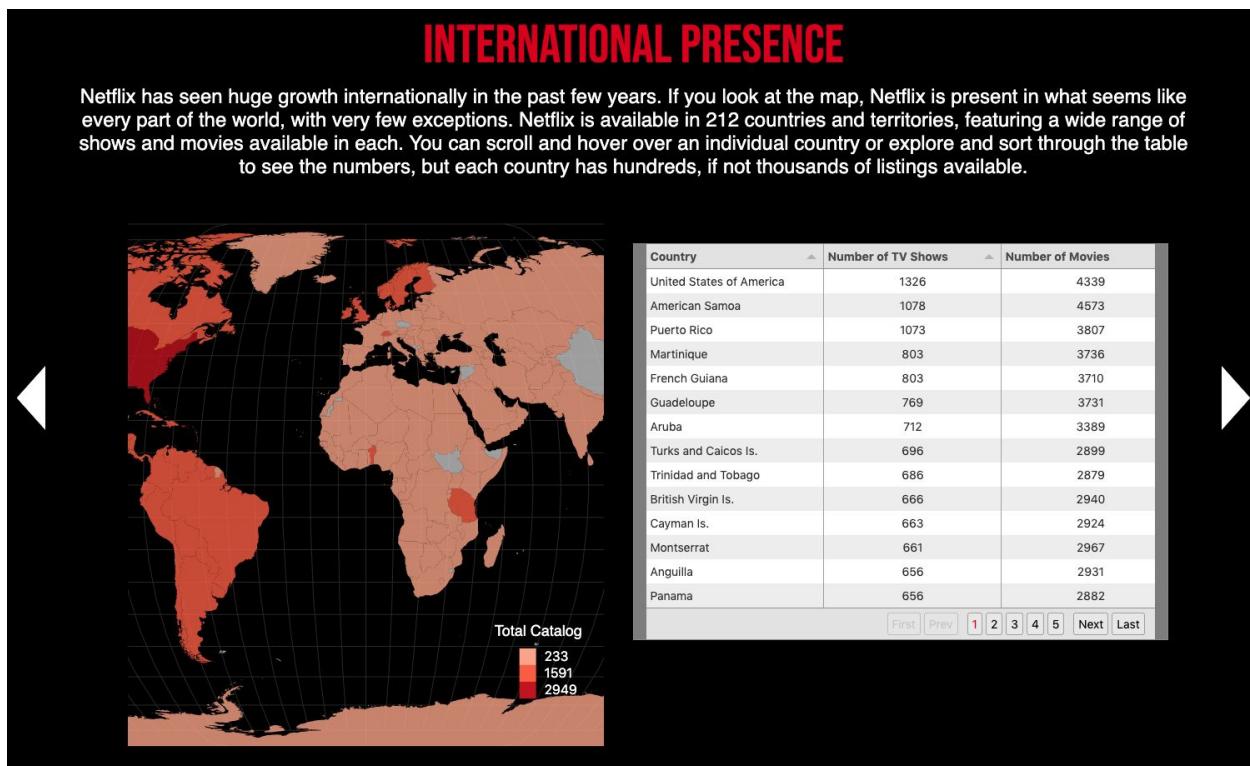
Description Dreamy delivery girl Ramona captures Scott Pilgrim's heart, but he must vanquish all seven of her evil exes in martial arts battles to win her love.

Release Year 2010

IMDB Rating 7.6



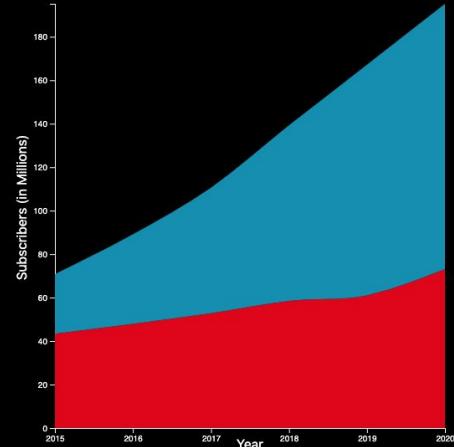
### 3. International Presence



## INTERNATIONAL PRESENCE

Another huge change has been in the number of international subscribers compared to the number of subscribers in the United States. You can hover over the bar chart or look at the table to see that, in 2015, the US (colored in Red) had 43.3 million subscribers, while there were only 27.4 million subscribers in the rest of the world (colored in Blue). Just five years later, in 2020, there are 73.08 million subscribers in the US, and 122.07 million subscribers in the rest of the world, demonstrating the scale at which Netflix has been able to expand globally.

### Netflix's Global Expansion



Year	International Subscribers (in millions)	United States Subscribers (in millions)
2020	122.07	73.08
2019	106.1	61
2018	80.8	58.5
2017	57.8	52.8
2016	41.2	47.9
2015	27.4	43.3

### Conclusion

## CONCLUSION

The diverse offerings of top-rated movies for a global audience has kept Netflix as the most successful, fan-favorite streaming service. Even as multiple new platforms have emerged in the industry and online streaming has surged in popularity during the 2020 quarantine, Netflix continues to stand out amongst its competitors.

Now that you're convinced to join Netflix, check out our recommendations below and get binging!

## Recommendations

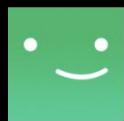
### OUR RECOMMENDATIONS



Adelson



Belinda



Michelle

Switch Account

**Top TV Shows for Belinda**

**Top Movies for Belinda**

**Belinda's Watchlist**

## Acknowledgements

The screenshot shows the 'ABOUT US' section of the website. At the top, there's a header with the title 'ABOUT US' on the left and 'CREDITS' on the right. Below the header, there's a paragraph about the final project for Harvard's CS171 course in fall 2020, created by Michelle Hunnewell, Adelson Aguasvivas, and Belinda Hu. A section titled 'TO LEARN MORE:' lists three items: visiting the GitHub project page, reading the process book, and watching the screencast below. Another section titled 'SCREENCAST:' shows a video player for a 'CS171: Netflix Binged Screencast'. To the right of the video player, there's a 'DATA SOURCES' section with four numbered items: Subscriber and Revenue Growth, Content Diversity, Viewer Enjoyment, and International Presence. Below that is an 'OTHER SOURCES' section with one item: 'The Fascinating History of Netflix'. At the bottom is an 'ACKNOWLEDGEMENTS' section with a paragraph of text.

## Final Thoughts

### Screencast

#### Questions

Our project evolved over time to answer two main questions:

- What does Netflix's success look like today?
- What are the reasons for this success?

Within these questions, we explored the three main reasons for Netflix's success: diversity in content, international presence, and ratings. The questions we explored are:

- What does content diversity look like and which genres have the most listings?
- How are listings distributed worldwide across countries?
- How has Netflix grown internationally vs. domestically in the US?
- What are the average ratings for movies and TV shows?
- What proportion of movies and TV shows have ratings over 6?

#### Design Strategy

We wanted to design our website to be similar to Netflix's style and did so through our color scheme and fonts. To create a readable layout, we used fullpage.js and implemented sequential scrolling. We explored different options to format text and make the website easy to navigate, like increasing text size, shifting visualizations, and including instructions.

To engage users, we implemented an interactive viewer enjoyment slider, in which the user can guess the average rating of all Netflix shows and movies. That way, they would be able to understand how the actual ratings compared to their perceptions of ratings.

To end on a lighthearted and fun note, we drew inspiration from Netflix's homepage for our recommendations page. We structured it like a Netflix home page and users can switch between "accounts" to see new recommendations from Belinda, Adelson, and Michelle (all three have different tastes). When the user first scrolls to the page, they are also able to hear the Netflix loading sound!

Overall, designs were tested and tweaked constantly to ensure easy and clear usage.

## Implementation

We implemented the project using a variety of libraries, like fullpage.js, tabulator, Bootstrap, etc.

For the subscriber by platform bar chart, we created our own dataset using readily available information on Google. The revenue over time bar chart was created using the revenue dataset from Kaggle. Both charts feature a tooltip for users to explore the data further.

The bubble chart was challenging to implement. We drew inspiration from this [zoomable circle packing map](#). We used a pack layout to create a hierarchy in the listings dataset, which would enable us to draw the nodes (circles) in d3. We ran into the challenge of Netflix having too many genres to implement a clear chart, so we sorted all 42 genres into "super genres". We implemented a tooltip featuring more information on each listing (when a user hovers over a white circle), as well as the option to click the circles to be redirected to the Netflix site.

We designed the viewer enjoyment to interact with the user. The user can guess the average rating for TV shows and movies by using a slider, and then further explore it scrolling to the right. We created a matrix (inspired by week 9 lab), colored by rating range, for users to click into each listing to see the rating, release year, and description of each listing. The main takeaway here is that most of Netflix's listings are highly rated on IMDB.

For international presence, we implemented a TopoJSON map (inspired by week 8 lab) to visualize the listings by country, as well as a tabulator table. We visualized international growth through a stacked area chart as well as another tabulator table.

Lastly, we included a fun recommendations page that is inspired by the Netflix homepage, in which users can click into each team member's favorite TV shows, movies, and watchlist. We hope that our users will find it helpful in looking for new shows and movies to watch.

## Challenges and Reflections

Overall, our team is very happy and proud with the work we were able to accomplish with this final project. We worked well together and worked hard to produce the best website and data story we could.

We were able to implement all visualizations that we sought out to. We had initially planned on collecting user data, but due to low response rates, transitioned to a storyline more focused on the platform rather than the user. However, if we had more time, we would have loved to be able to explore more deeply into Netflix data. We could expand on our analysis of Netflix's success to include other aspects of the platform. This version of our website studied 3 main reasons: content diversity, viewer enjoyment, and international presence. Given more time, we could have sought out more data to explain the success of Netflix. Additionally, with more time, we would continue to tweak with the styling of our website to provide the best experience for our users. All in all, we are very proud of the work our team has done.