Lab 1 – FlixPicks Product Description

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1. Introduction

As technology advances in the twenty-first century, individuals around the world are increasingly seeking convenience. The demand is for swifter and more intelligent technology with the ultimate goal of simplifying the user experience. Capitalizing on this desire for convenience are streaming services. Streaming services, as defined by Britannica, represent a "popular method of conveying and sharing mass media" (Britannica, 2024). Elaborating upon the definition, mass media takes on many forms like movies, tv shows, and documentaries for prominent streaming platforms such as Netflix, Disney Plus, and Hulu, but there are over two-hundred paid streaming platforms globally to utilize (Cook, 2023).

With the evolution of streaming services and the emergence of platforms to facilitate this novel way of consuming media, individuals gained the capability to choose their preferred content, decide when to watch it, all at the simple touch of a button. As a result of the catering features provided by streaming platforms, their usage gained popularity. Now, seventy seven percent of Americans favor streaming services over traditional cable television (Raj, 2023), with an anticipated nine percent annual growth rate, surpassing cable television's four percent projections (Raj, 2023). Upon accessing a streaming services platform, individuals are presented with thousands of content options, ranging from entertaining to educational.

Streaming services have effectively met the demands for convenient media consumption when considering conventional cable television. As streaming platforms become commonplace however, a new facet of convenience is required and the means to achieve it are observed within the platforms themselves. The streaming platforms offer a plethora of content options, leading to a rising number of individuals experiencing decision fatigue.

Decision fatigue, as defined by Washington State University, is "mental exhaustion resulting from the sheer number of decisions a person must make daily, leading to difficulty making – or making good – decisions." (Washington State University, 2024). While the extensive number of content options places streaming services ahead of competitors, it can manifest itself as a drawback for many individuals engaging with the platform. In a specific case study centered on today's most popular streaming service Netflix, it was discovered that individuals on average dedicate seventeen point eight minutes to exploring content options before settling on a viewing choice (Moscaritolo, 2016). Annually, individuals are reported to allocate as much as one-hundred and eighty-seven hours in search of media content to enjoy (Ward, 2020). Given the expected growth rates of streaming services, it becomes imperative to find a solution for decision fatigue.

Taking into account the decision fatigue inherent in all streaming platforms, FlixPicks alleviate the issue by eliminating the indecisiveness outright. Leveraging active subscriptions to the individual's chosen streaming platforms, FlixPicks curates a personalized collection of content options within a selected media type (movies, tv shows, documentaries). Through an interactive interface, FlixPicks randomly pick a media option for the individual to settle on. Functionalities for collaborative media selection and real time social features for media viewing are provided by FlixPicks array of use options. FlixPicks introduces a fresh perspective on streaming service viewing by provides utilities that eliminate decision fatigue.

2. FlixPicks Description

Introducing FlixPics, the latest advancement in media consumption that tackles the issue of decision fatigue prevalent across today's streaming platforms. True to its name, FlixPicks selects media tailored to the individual, effectively eliminating prolonged periods of

indecision and optimizing the viewing experience through social overlays during media viewing. FlixPics seamlessly integrates with linked streaming subscriptions, and employing built-in machine learning, provides individuals with a personalized taste profile — a curated collection of media based on the user's selected preferences from all platforms. By implementing an additional level of convenience to the already successful model of streaming services, FlixPicks aims to enhance the process and embed itself in the rising growth rate trend projected in the years to come.

2.1 Key Product Features and Capabilities

Individuals interested in using FlixPicks have the ability to access as a guest user or registered user. For individuals opting to register, upon startup they are presented with an account creation window that prompts individuals to select a desired username/display name and set up a password for their FlixPicks account. During registration, individuals are required to provide a preferred email address for verification and input information regarding their existing streaming subscriptions. Upon the successful completion of the initial account creation requirements, FlixPicks activates its first distinctive feature, taste profiles. A taste profile in FlixPicks refers to personalized content recommendations for registered users, derived from their individual preferences and taking into account factors such as relevance, producers, genre, ratings, and media length. Registering users obtain a taste profile through a step-by-step setup featuring prompts that the FlixPicks machine learning algorithm utilizes in crafting the personalized taste profile. After the taste profile generation, the registering user's dashboard is created, providing them with the capability to explore and make use of other features offered by FlixPicks.

For registered users seeking to alleviate the decision fatigue inherent in the streaming selection process, one of FlixPicks unique features offers a solution. Simply navigating the home screen dashboard lands users on a feature referred to as CineRoll. CineRoll in FlixPicks is a unique service that utilizes a registered user's taste profile to filter and randomize media selections, ultimately generating a viewing choice for the user. Upon entering the CineRoll dashboard, registered users encounter content filtering tools, including tags and operators, and selection prompts necessary for the algorithm to make an informed decision on its media selection. After the CineRoll algorithm makes a media selection, it offers the option to the registered user. The registered user can then decide whether to view the chosen option, edit the algorithm filter selections, or reroll for a new media selection. Should the registered user be content with CineRoll's media suggestion, the only remaining step is for the user to find the recommended media on the designated streaming platform indicated by FlixPicks.

For user's that often share their media viewing experiences with others, FlixPicks offers a straightforward and effective feature that adds excitement to the decision-making process within the group. By navigating the home screen dashboard, users can access the CineWheel feature. CineWheel in FlixPicks refers to the media selection tool designed for gatherings of up to two or more individuals. Upon accessing CineWheel, requests for the count of participating individuals in the group, along with their corresponding media selections, are prompted for. Once the group selections are inputted into CineWheel's algorithm, each individual's likelihood for selection is assigned equivalent values on a one-hundred-point scale. The CineWheel algorithm then selects one of the options and presents the selection to the group members. The group members can then decide whether to view the chosen option,

edit the algorithm filter selections, or reroll for a new media selection. Should the group members be content with CineWheel's media selection, the only remaining step is for the group members to find the selected media on the designated streaming platform indicated by FlixPicks.

Upon selection of a media option with the help of either CineRoll or CineWheel, registered user's do not have to bid farewell to FlixPicks. Registered users seeking a more engaging and social viewing experience can fill this desire and eliminate the typical static viewing process. Following the selection process, registered users simply need to activate the CineMap feature located on the home screen dashboard. CineMap in FlixPicks is a media overlay that offers viewers the ability to timestamp their content. The timestamps serve as the viewer's means to express commentary on key moments or to access the filtered commentary of other registered users of FlixPicks. Upon activation of CineMap, the registered user receives a prompt for their media selection. The CineMap algorithm identifies the streaming service linked to the selection and guides the user to the corresponding viewing platform, with the overlay ready upon redirection by FlixPicks. Once the media begins playing, the viewer simply needs to interact with the touch and hide overlay at their convenience. Creating the viewing the timestamps is as straightforward as pausing the media at the desired point and choosing the corresponding view or post options.

2.2 Major Components (Hardware/Software)

To bring FlixPicks's innovative features to users, the service offers a cross-platform implementation. Accessing requires a computer equipped with either Windows, MacOS, or Linux, a smartphone device running iOS or Android, or a Smart TV/accessory device, all of which require a functioning network connection. FlixPicks is on the internet and easily

accessible through any preferred browser including Google Chrome, Firefox, or Edge. FlixPicks features a structured front-end interface designed to cater to the primary user roles of guests and registered users. The backend structure requires the use of both an application server and a database server. The application server manages communications between the front-end and the database, while the database server provides a centralized location for data storage and retrieval operations. The designated servers are capable of being either cloud based on hosted on-premises. Figure one provides an illustration of FlixPicks intended application architecture.

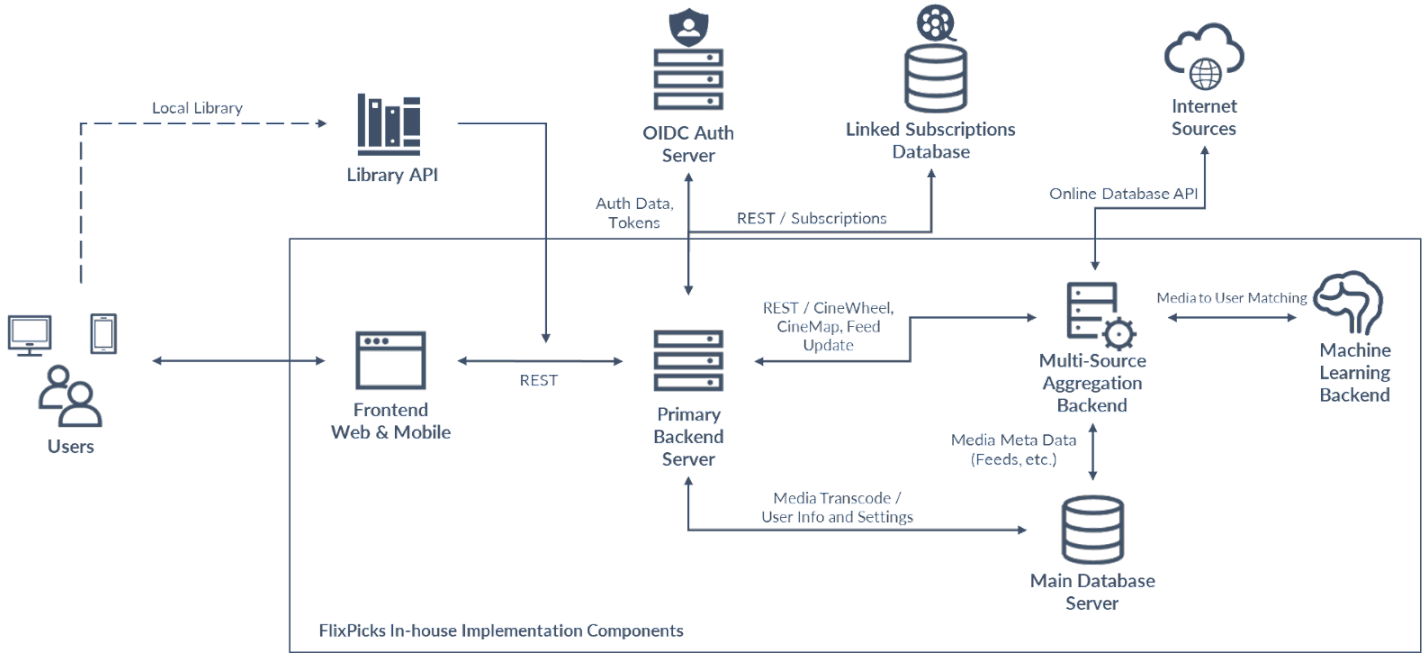

Figure 1: *Main Functional Component Diagram*

The software implementation employs HTML, JavaScript, Python, and CSS languages with browser extensions running JavaScript. Development is conducted with the Integrated Developing Environments (IDE) Visual Studio Code and Eclipse and the codebase is stored on GitHub, offering version control for team orange developers and real-time issue tracking.

FlixPicks leverages YouTube data application programming interface (API) and a third-party Netflix API to enhance the recommendation algorithm, an integral component in FlixPicks's taste profile generation. The software is containerized using Docker for both portability and scalability.

The majority of front-end software capabilities are hosted on Apache Tomcat, serving as the application server that FlixPicks runs off. Essential structed data, such as user information, is stored on the MySQL database server, which is hosted and designed to seamlessly handle storage and retrieval operations. For the generation of taste profiles and for media selection intelligence, FlixPicks utilizes machine learning algorithms via Amazon Web Services (AWS) and incorporates Amazon Personalize for media recommendations.

The standard protocols FlixPicks operates under include TCP/IP, HTTP, and REST for web communications and SSL/TS to bolster interaction security. Authentication and authorization protocols include OAuth 2.0 and OpenID Connect, aiding in secure access to API's and resource access to authorized users.

3. Identification of Case Study

FlixPicks tackles the issue of decision fatigue prevalent across today's streaming platforms and primarily targets individuals that have experience with the challenge. Additional criteria for target individuals include having at least one, but preferably two or more, active subscriptions to streaming platforms. To utilize the innovative features offered to registered users, the algorithm requires access to the media offerings on a registered user's streaming platforms. Without existing subscriptions, FlixPicks lacks the necessary information to generate recommendations and selections. Broadly speaking, FlixPicks is designed for anyone who desires to watch

something. With the aim of improving the decision-making process, FlixPicks seeks to complement individuals who have a passion for the media viewing experience.

The intent of FlixPicks is for individuals to utilize the features during overwhelming moments when a decision seems challenging. The features offer usability for both individual users and large groups through the incorporation of CineRoll and CineWheel. The CineRoll feature is designed as a one-to-one problem-solving solution, catering to a single user and providing a single selection. The CineWheel feature is designed as an all-to-one problem-solving solution, catering to several users and providing a single selection for the accessing group. FlixPicks employs CineMap to maintain a social and expressive viewing process, allowing users to share opinions and avoid being confined to a static viewing experience. FlixPicks serves as a tool for enhancing the streaming service selection process and adding a dynamic element to the viewing process.

The real-world product aims to target a limited user base, encompassing individuals both well-equipped to utilize FlixPicks's services and individuals who are not. A well-equipped user is someone with clearly defined favorite genres and/or directors, or an individual subscribed to multiple streaming platforms. In contrast, an ill-equipped user exhibits opposite characteristics. The emphasis is on demonstrating the products use cases, media decision making and dynamic viewing of media selections. The product tracks user activity and selections and collects usage statistics for analytics.

4. FlixPicks Prototype Description

By incorporating the key innovative features, the FlixPicks prototype aims to demonstrate the core functionality of the application. Key innovative features include CineRoll, CineWheel, and CineMap, along with a personalized taste profile for each user. By excluding the implementation

of search filtering, tier access levels, and media redirects, the prototype can focus on the development and testing of distinctive features that set it apart. As FlixPicks progresses, the elements undergoing thorough development and testing are intended to serve as the foundation for the partially implemented and omitted features.

4.1 Prototype Architecture (Hardware/Software)

The FlixPicks prototype provides its implemented features via the internet as a web application hosted on computer devices through any preferred browser including Google Chrome, Firefox, or Edge. The application server and the database server are hosted on virtual machines (VM) provided by Old Dominion University's Department of Computer Science, serving as dedicated server units throughout the prototype development lifespan.

Application development incorporates Docker to containerize each component of the Linux/Apache/MySQL/Python (LAMP) stack, allowing team developers to concentrate on specific components without conflict. The application server is deploying on Apache Tomcat, specifically adopted for JavaScript web applications, and the deployment of the database server on MySQL ensures reliability, supported by its extensive usage and compatibility with diverse application platforms. Python is intended for utilization in the database programming, providing a comprehensive library selection and powerful object-relational mappings (ORM). Web development uses a combination of HTML, JavaScript, and CSS, each contributing to the responsiveness and appeal of the website. Development occurs in the IDE's Visual Studio Code and Eclipse and the codebase is managed and stored on GitHub to provide version control and issue tracking.

4.2 Prototype Features and Capabilities

The FlixPicks prototype implements unique core software for the features of CineRoll, CineWheel, and CineMap, along with the generation for a user's personalized taste profile. Peripheral features including account creation and navigation capabilities are implemented for accessing and embellishing the core features. FlixPicks components such as subscription integration and data analytics are partially implemented, with the intention to remaining trim for improved developer allocation on innovative features. Features with less innovation significance such as search filtering and media redirects are omitted from the prototype and real-world product.

Category	FlixPicks Feature	RWP	Prototype
Subscription Service Management	Account/Subscription Service Management	Fully Implemented	Fully Implemented
	User Account Creation/Registration	Fully Implemented	Fully Implemented
	User Subscription Integration	Fully Implemented	Partially Implemented
	User Tier Level Feature Access	Fully Implemented	Partially Implemented
Taste Profile	Taste Profile	Fully Implemented	Fully Implemented
	Taste Profile Form Pop-Up	Fully Implemented	Fully Implemented
	Taste Profile Content-Based Filtering	Fully Implemented	Fully Implemented
	Taste Profile Collaborative Filtering	Fully Implemented	Fully Implemented
Recommendations	Recommendations	Fully Implemented	Fully Implemented
	Filtered Recommendations (Criteria based)	Fully Implemented	Fully Implemented
Filtering	Browse/Search Filtering	Fully Implemented	Fully Implemented
CineRoll	CineRoll	Fully Implemented	Fully Implemented
CineWheel	CineWheel	Fully Implemented	Fully Implemented
CineMap	CineMap Overlay	Fully Implemented	Fully Implemented
	CineMap Commenting	Fully Implemented	Fully Implemented
	CineMap Export Data	Fully Implemented	Partially Implemented
	CineMap Data Analyzing	Fully Implemented	Partially Implemented
Analytics	Data analytics testing	Fully Implemented	Partially Implemented
	Analytics	Fully Implemented	Partially Implemented
Simulation	Simulation	Eliminated	Fully Implemented
Movie Info	Create/edit Movie Info	Eliminated	Fully Implemented
Reporting	Summary reporting for user/stakeholders	Eliminated	Fully Implemented

Figure 2: *Real-World Product versus Prototype Features Table*

Features considered partially implemented are features that, while not contributing innovatively to FlixPicks, are essential at a basic level for the application to operate. A majority of the partially implemented features relate to data analytic functions for CineMap datasets and user usage statistics. In a proof-of-concept prototype, the objective is to demonstrate the unique capabilities of the application, with the full implementation of statistic gathering functions coming after confirming the implementation of the core features.

Fully implemented prototype features are features that contribute innovatively to FlixPicks and are integral to the core functionality of the application. The Fully Implemented features distinguish FlixPicks as a solution, addressing decision fatigue and serving as a supplement to the streaming decision-making process. FlixPicks' CineRoll and CineWheel features are specifically developed to eliminate decision fatigue and for guest users, CineWheel is a complimentary feature, requiring no tailoring functions.

4.3 Prototype Development Challenges

During the developmental stages of the FlixPicks prototype, adopting the perspective of an app user provides valuable insights into anticipated issues and concerns. The hypothetical user concerns are referred to as customer risks, encompassing the potential issues users may encounter when engaging with FlixPicks features. Customer risks shape user satisfaction levels, and with low satisfaction levels, FlixPicks faces the possibility of decreased user engagement. The CineMap feature allows for engaging and social viewing experiences through timestamping commentary to key moments of the media. An unrestricted communication channel creates the potential for undesirable sharing of spoilers and inappropriate content. The CineMap prototyping considers the possibility of unwanted timestamping and incorporates a detection algorithm to address it. The detection algorithm screens for explicit content, film spoilers, and personal

information, ensuring that the shared thoughts remain pertinent to the media. The filtering of media timestamps ensures users of all ages can enjoy the feature safely, without getting spoiled. Incentive to use the CineMap feature is a priority, and additional features to promote engagement are planned for further consideration in the prototype. User apprehension and uncertainty when exploring new applications can be overwhelming, and the prototype tackles the concerns by incorporating navigation and usage tutorials for all the innovative features.

During the development stage of the prototype, efforts are focused on resolving concerns that could hinder the implementation of the core innovative features. Technical risks encompass scenarios that could impede the complete implementation or hinder the development of core or innovative software. FlixPicks operates in conjunction with streaming services and the media libraries hosted through them. Access permissions to currently streaming media on specific platforms are necessary to offer recommendations in the form of taste profiles and CineRoll. As a core requirement for FlixPicks, conveying to the streaming services that the app is intended solely for enhancing and supplementing the viewing experiences is the primary action for resolution. The prototype application utilizes simulated data to demonstrate the viability of the software intended for implementation. The use of inaccurate and irrelevant simulation data contributes minimally to validating the effectiveness of the innovative features. Enacting regular integrity checks reduces the probability of low-quality simulation data entering the data pool and is implemented throughout the prototype development. With suggestion software integrated into features such as CineRoll, recommendation algorithms must generate reliable and precise suggestions that align with the user's interests. Subpar suggestions based on minimal user input leads to low-satisfaction and an increased probability of abandonment of the service. The prototype aims to incorporate implicit interaction feedback through input prompts and explicit

interaction feedback derived from reviews, ratings, and watch history allowing the machine learning algorithm to enhance its performance. FlixPicks incorporates an overlay with media selections that could inaccurately capture timestamps, causing desynchronization between the media and the commentary. Through the prototype development process, regular integrity tests are conducted to minimize the likelihood of future occurrences. The innovative features developed in the prototype depend on third-party API's to seamlessly perform their functions. In the occurrence of an API being decommissioned, essential features of the service would be non-operational. To reduce the probability of API standstills, status checks and reliance on API's is discouraged and gradually phased out as data sources are diversified.

Individuals accessing FlixPicks must connect through the internet, requiring the development of privacy and security measures to protect software assets and personal user information. Security risks that threaten the user's privacy or information and FlixPicks software require attention during prototype development. To access the innovative features of the application, individuals must register accounts and link active subscriptions, and with use have information tailored for recommendation algorithms. To further safeguard the information acquired by registering an account with FlixPicks, additional authentication software is implemented to enhance security. The security measures implemented into user-application interactions are integrated into backend client-server interactions to enhance the reliability of the prototype software.

5. Glossary

- **Android**: A mobile operating system manufactured and utilized by Google, Samsung, and various other companies

- **Apache Tomcat:** An open-source implementation of the Java Servlet, Java Server Pages, Java Expression Language, and WebSocket technologies. Tomcat provides a “pure java” HTTP web server environment for the execution of Java code

- **API:** An Application Programming Interface is an interface facilitating interactions between various software applications or combinations of hardware and software intermediaries

- **CineMap:** CineMap serves as an optional media overlay in FlixPicks, enabling users to engage in commenting and viewing of interactions by other registered users. CineMap presents a timeline highlighting significant points in a media selection based upon user activity

- **CineRoll:** A functionality within FlixPicks that produces randomized media selections based upon a user’s preferences. Leveraging the Taste Profile, CineRoll generates recommendations specific to users

- **CineWheel:** A FlixPicks feature that randomly picks from a list of user-provided choices. The tool is best used when members of a group are experiencing decision fatigue

- **CSS:** Cascading Style Sheets serves as a style sheet language commonly used to customize the visuals of a document written in a markup language such as HTML. CSS stands as a fundamental technology for the World Wide Web, working in conjunction with HTML and JavaScript

- **Git:** A software designed to monitor modifications in any collection of files, typically to coordinate collaborative work among developers in joint development of source code

- **HTML:** Hyper Text Markup Language serves as the standard markup language for constructing web pages. HTML elements guide the browser on rendering content and establishing the structure of webpages

- **IDE:** An integrated development environment is a software application that provides comprehensive facilities to computer programmers for software development

- **iOS:** A mobile operating system used for devices manufactured by Apple Inc.

- **JavaScript:** A scripting and programming language used for implementing advanced features and interactivity with on web pages

- **MySQL:** An open-source relational database management system

- **Netflix:** A subscription-based streaming service that allows members to watch media on internet-connected devices

- **Stakeholders:** A person with interest or concern in something, especially a business

- **Streaming:** A method of transmitting or receiving data over a computer network in a continuous flow, allowing playback to start while the remaining data is still being processed

- **Taste Profile:** A user profile on FlixPicks that has access to their subscriptions, recommendations, and other settings. The taste profile fine tunes as a user makes selections on the application and can be reset at the user's discretion.

- **Virtual Machine:** A VM is an emulation of a physical machine that operates as a software-based platform

6. References

- Clark, Travis. (2022, April 20). How Netflix, Disney+, HBO Max, and more major streamers compare on content and cost. https://www.businessinsider.com/major-streaming-services-compared-cost-number-of-movies-and-shows-2022-4

- Cook, Sam. (2023, September 06). The Complete List of Streaming Services – 200+ Services. https://flixed.io/us/en/complete-list-streaming-services

- Durrani, Ana. (2023, March 27). The Average American Spends Over 13 Hours A Day Using Digital Media—Here's What They're Streaming. https://www.forbes.com/home-improvement/internet/streaming-stats/

- Fischer, Sara. (2022, August 18). Streaming surpasses cable as top way to consume TV. https://www.axios.com/2022/08/18/streaming-surpasses-cable-tv-market-share

- Glover, Emily. (2023, March 9). Nearly 50% of people pay for streaming services they don't use. According to new Forbes survey. https://www.forbes.com/home-improvement/internet/streaming-survey/#:~:text=According%20to%20the%20survey %20findings,services%20the%20average%20person%20uses.

- Moscaritolo, A. (2016, July 21). Netflix users waste a ton of time searching for something to watch. PCMAG. https://www.pcmag.com/news/netflix-users-waste-ton-of-time-searching-for-something-to-watch

- Natal, G., & Saltzman, B. (2022, January) Decisions, decisions, decisions: decision fatigue in academic librarianship. The Journal of Academic Librarianship, 48(1) https://doi.org/10.1016/j.acalib.2021.102476

- O'Brien, Clodagh. (2023, June 14). The Unstoppable Success of Netflix. https://digitalmarketinginstitute.com/blog/the-unstoppable-success-of-netflix#:~:text=Netflix's%20marketing%20budget%20has%20remained,to%20the%20New%20York%20Times.

- Pattison, S. (2023, September 17). 35 streaming services statistics you need to know in 2023. Cloudwards. https://www.cloudwards.net/streaming-services-statistics/#:~:text=Although%20we%20may%20only%20think,Netflix%20the%20%231%20Streaming%20Service%3F

- Ward, Amelia. (2020, August 20) People Spend 187 Hours A Year Searching For Something To Watch on Netflix. https://www.ladbible.com/entertainment/tv-and-film-people-spend-187-hours-a-year-browsing-netflix-20200820