Heuristic Art Library Final Report
Software Engineering Process Recommendations

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Executive Summary

Our main mission and vision for HAL is to provide a user-friendly, cross-platform streaming service that shows excellent independent films to our customers with through-out easy accessibility. HAL shows the functionality of other streaming platforms such as Netflix, Hulu, Crunchyroll, Prime Video, and more. It also includes a rating and review feature similar to things on other platforms such as IMDB and Rotten Tomatoes. The primary requirements for HAL include:

- The system stores data of all of the movies watched by the user in order of films that are currently being watched.
- The system should recommend movies that are trending and popular based on the number of streams.
- The system must show the rating each movie has on a five-star scale.
- The system must have a continue watching section where all of the movies that have been started but haven't been finished are listed.
- The system must allow subscribers to post reviews of movies they have watched.
- The system must allow subscribers to view and sort all of the reviews posted on a movie.
- The system must give users recommendations based on the movies they have previously watched.
- The system should incorporate user ratings when giving recommendations of movies.
- The system could list out all of the movies by a particular director when the user clicks on the name of a director.
- The system must know all of the genres of each of the movies in its catalog.
- The system must be able to filter movies based on the genres requested by the viewer.

HAL will be created by using the scrum process. Our plan is to release a beta version of HAL within four months, with a series of two or three-month maintenance cycles for new and more content delivery. Each sprint will last three weeks for a total of eight sprints. Each of our sprints will produce minor viable features, such as ratings and ranking systems. In order to make this possible a group of 20 team members, including the Scrum Master, a Product Owner, and Developmental Team Members. The team will be split into four, where each team will develop and handle aspects of a backlog productivity.

Section 1. Introduction

Heuristic Art Library's (HAL) primary goal is customer satisfaction and our SW system is organized in order to optimize this principle. Our video-streaming site SW system will be a website that optimizes the experience of watching indie and up-and-coming director's movies. The functions we will offer include the organization of the movies by categories such as genres, a rating and review system to evaluate the movies, and a suggestions system that suggests other movies a user might like based on the rating they have given to movies that they have watched. We picked these features to maximize the ability of viewers to find and watch movies that they will enjoy. Organizing the movies into categories allows the viewers to browse things that interest them, which saves time when trying to find things to watch. The review and rating system will be helpful to the viewers as well as the indie movie industry as they can use the data to analyze what consumers are enjoying. The suggestions system simplifies the movie selection process each time a viewer is looking for a new movie. With all of these features, we will be able to give a better viewing experience to our users.

HAL is a video-streaming service specializing in indie films. It's comparable to other big streaming services like Netflix and Hulu, except it's more straightforward, with a smaller selection of low-budget independent films and fewer subscription alternatives. HAL's goal is to help new directors and artists break into the film business by distributing independent films to a broader audience online and even providing a matching tool to help indie filmmakers get funding. The worldwide video streaming market is predicted to increase at a CAGR of 12.1% between 2021 and 2028, from USD 419.03 billion in 2021 to USD 932.29 billion in 2028. According to Fortune Business Insights, in a research titled "Video Streaming Industry Market, 2021-2028", the rising popularity of streaming services such as Netflix, Hulu, Amazon Prime, and others might have a significant influence on market growth in the next few years. In 2020, the market was valued at USD 376.06 billion ("Video Streaming Market Share to Touch USD 932.29 Billion by 2028"). The streaming service industry continues to grow due to the industry giants and the vast

competitiveness with new companies joining the industry. According to businessofapps.com, there are 16 internationally known streaming services that dominate the industry, as well as a number of small streaming service providers (“Video Streaming App Revenue and Usage Statistics (2022)”). These companies buy out the rights to movies and TV shows that are viewable exclusively on their websites. When HAL decides to join this highly competitive industry, it won't be the first and it certainly won't be the last company.

Furthermore, there are certain aspects that HAL must exceed in order to beat out already successful companies. One of them is the ability to expose indie-films as they aren't as easily accessible as traditional films. Whether that is due to the director not being known enough, or a user’s region, HAL intends to become the main source of distributing indie-films to the public while also incorporating typical video-streaming service qualities.

Within the video-streaming service industry, there are many stakeholders that are common across different companies and are often organized into two categories, internal and external stakeholders. Internal stakeholders are individuals who have interests in the company through a direct relationship, while external stakeholders are those who don’t directly work with the company but are affected by its actions.

- Finance Friend
    - She was the first one to have an interest in starting the video-streaming service as she was the one to ask us to develop HAL. While also being a start-up fund investor and a big indie film supporter with many existing partners in the film industry, she is vital to the start-up process.
- Employees

    - HAL's success would be dependent on attracting the best developers and engineers and those developers determine how successful HAL becomes. They will also have a vested interest in the company as it holds their job security.
- Subscribers
    - They are the ones who will be paying for the streaming service and we want to take their requests to guide us on what we want to implement in our services.
- Competitors
    - Companies such as Netflix and Disney+ are some examples. To remain competitive, HAL would need to ensure that its SW system is good enough to gain a competitive advantage over other streaming services.
- Indie-Film Enthusiast
    - They would be able to watch the films they like as well as others all on HAL. This specific groups feedback will be crucial to the video-streaming service, as they will make up a majority of the users.
- Indie-Film Directors
    - HAL's goal is to support emerging directors within the movie industry and the films we choose impact the number of customers we attract.

When implementing our service, these stakeholders are crucial in each stage of the project development of the video-streaming service HAL.

Section 2. Software Requirements

2.1 Business Needs and Requirements

Film directors:

- Directors of films that have their films on HAL will have access to analytics to help them evaluate the success of their films. The analytics will include:
    - Analytics about the subscribers that watched the films. This will allow the director to correctly identify their target audience's age range and help them tailor future movies to that audience.
    - Analytics about viewership of the film including average watch time, engagement dropoff moments, and sittings to finish the movie. This will give more precise information about the quality of the movie through different parts of it and if audiences enjoyed continuing to watch it.
    - Rating and review details for their films. More details than are available to other HAL subscribers will be given in order to determine the enjoyment for different demographics.

Subscribers:

- Requests for other indie films you would like to see added to the platform. This will make it so that the platform accepts subscriber input and is tailored to their interests.
- Customer service contacts so that there is technical support when you run into problems. Subscribers will be able to get help whenever they need it 24/7.
- There will be rating and review features so that they can express their opinion on the films they watch. This will also let users do preliminary research on a movie before they decide to watch it.

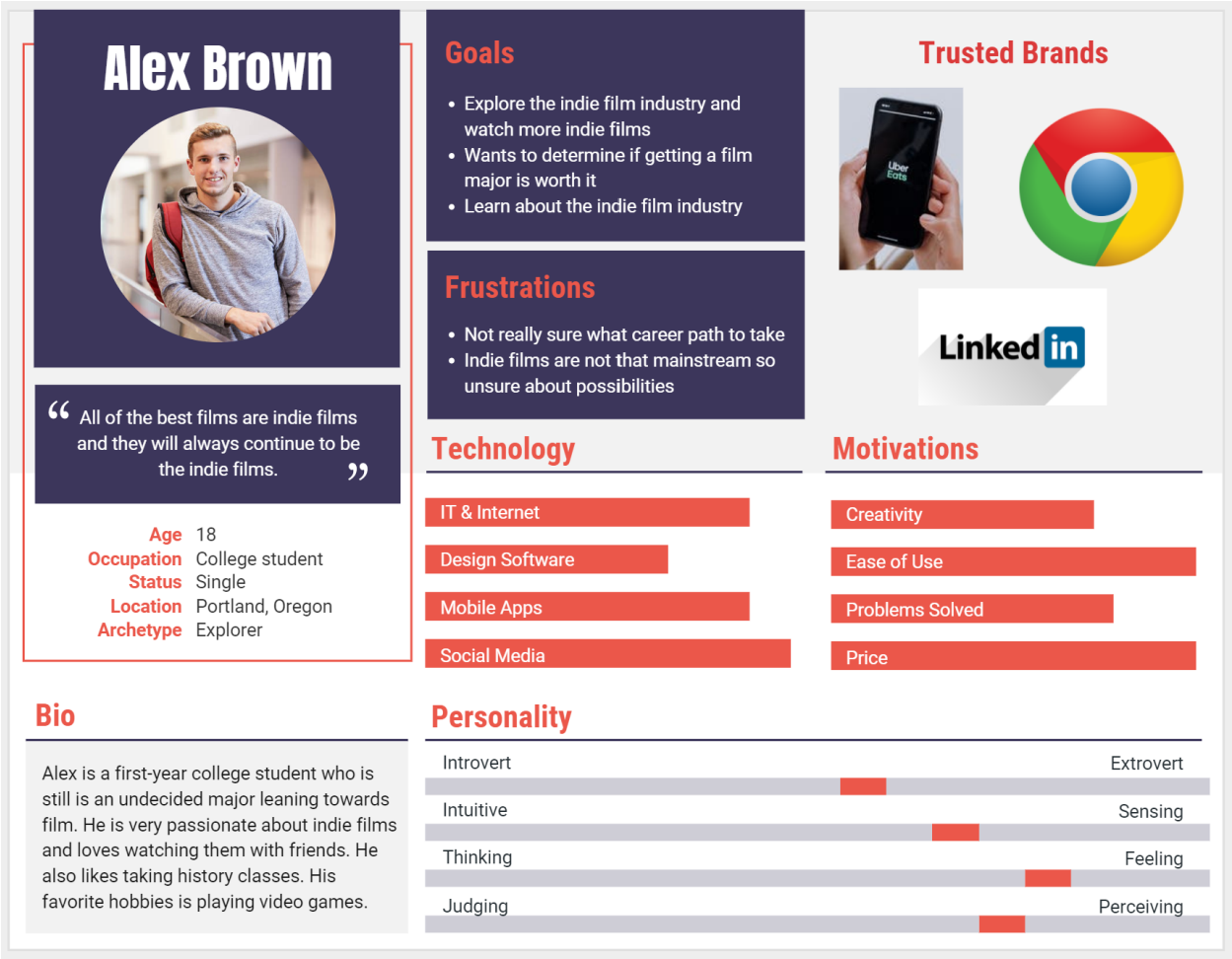
Finance friend:

- Funding will be provided by the finance friend so she will have some say over final decisions.

- Unique features will not only help gain a larger subscriber base but also help generate revenue growth.

2.2 Personas

Persona 1:

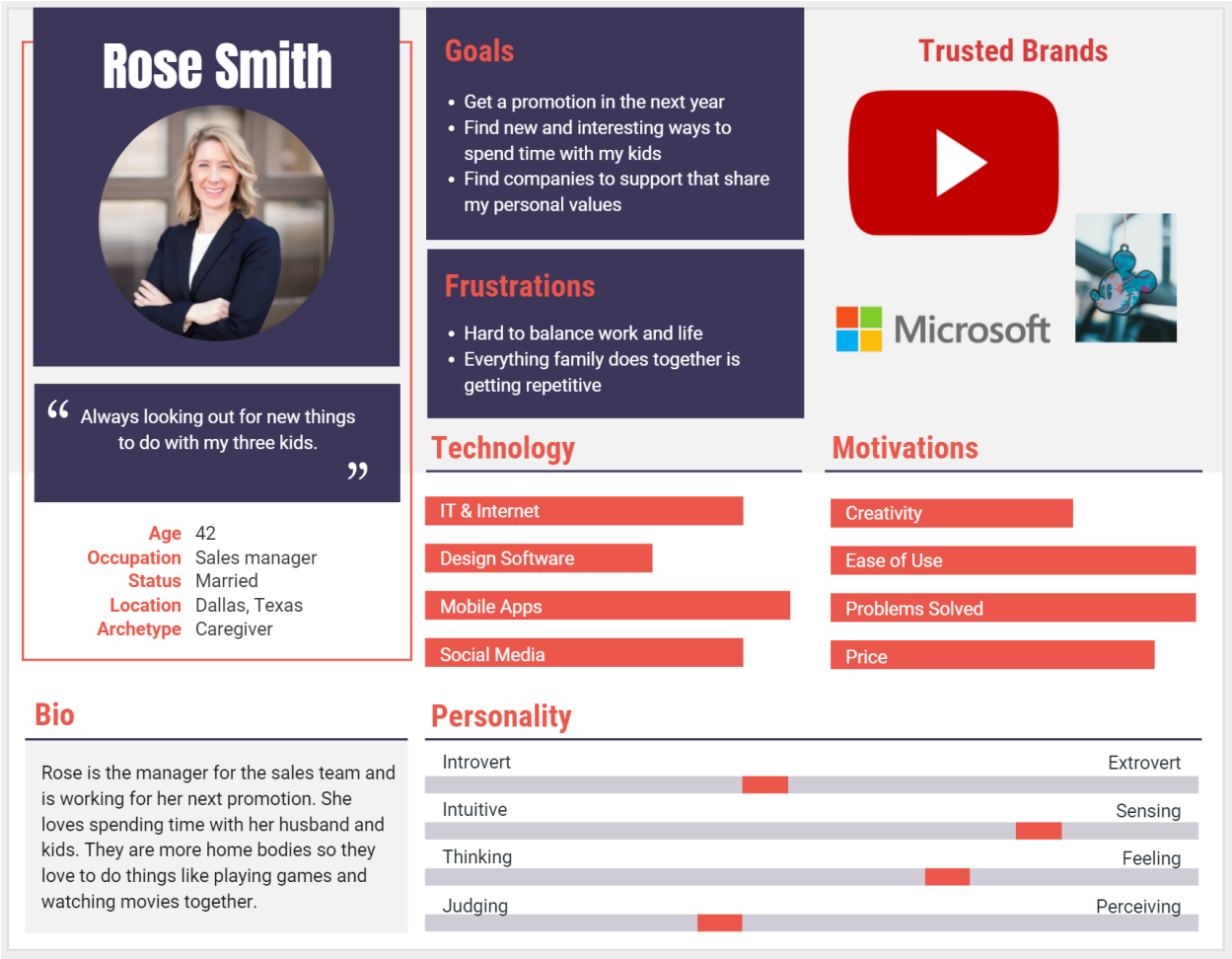


Rational:

This persona was selected because people that already enjoy indie films are a great place to begin growing HAL's customer base. Since they are already familiar with the content and like it, they will be appreciative of the change to view more like it all in one place. It will be an easy place to get subscribers from and if they tell others they know that they also enjoy watching indie films it has the potential to get

picked up by the entire fanbase community. The criteria that were used to make this decision include size, importance, and potential.

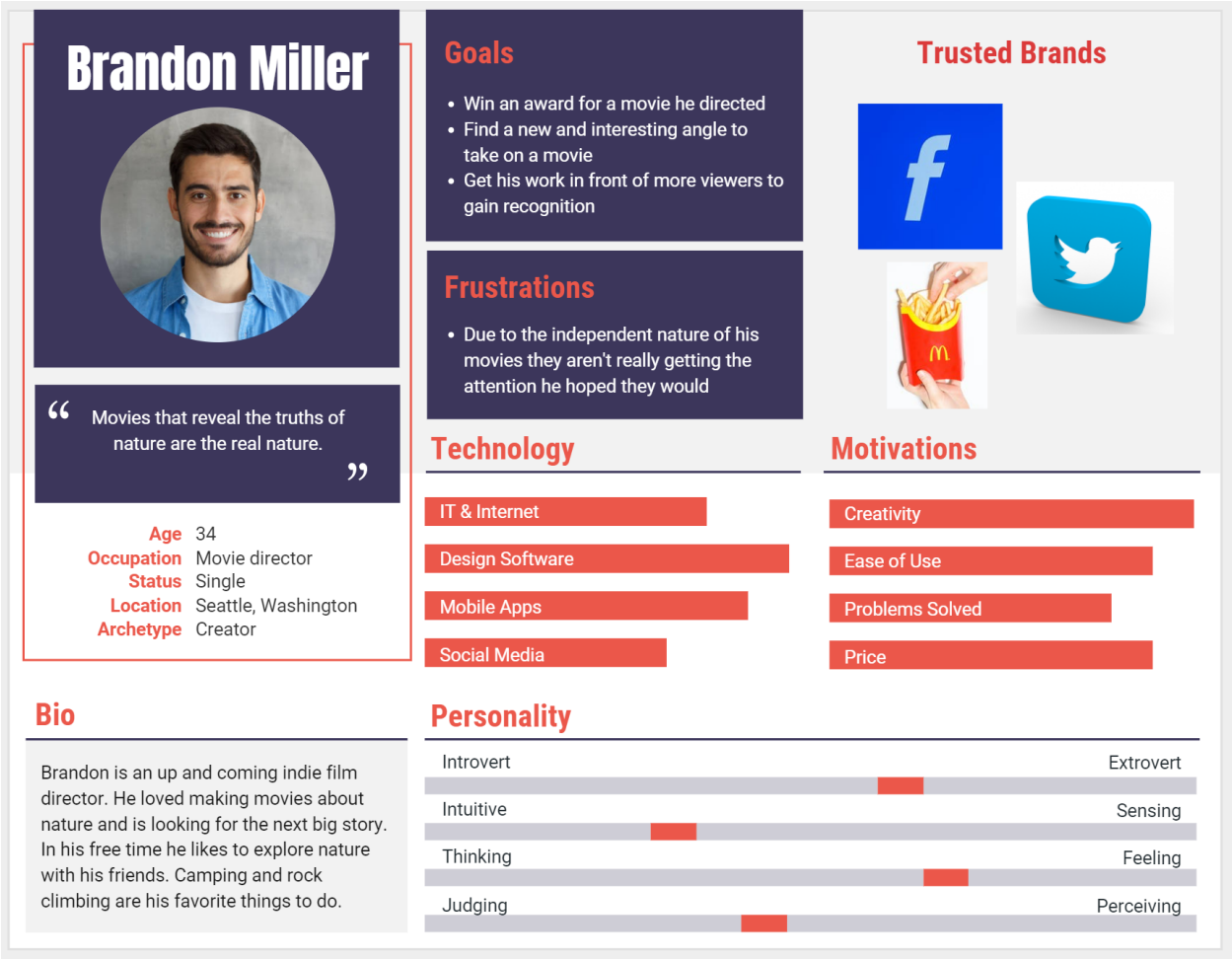
Persona 2:



Rational:

This persona was selected because it is a common bonding activity for parents to watch movies with their children. Parents often watch the same movies as other parents and we can use that to grow our customer page. If some parents are saying a movie was good to watch with their kids' other parents will take that as advice and watch that movie with their kids. The criteria that were used to make this decision include size, importance, and potential.

Persona 3:



Rational:

This persona was selected because indie film directors can look at what other indie film directors are doing based on HAL. They can see what types of movies are doing well based on the rating features and use that to inspire them and help them create movies viewers will enjoy. Additionally, movie makers like watching similar movies to the ones they make so they will be able to find movies they might enjoy watching. The criteria that were used to make this decision include size, importance, and potential.

2.3 User Scenarios and User Stories

User Scenario 1: Rose is able to spend quality time with her family.

Rose is a working mom who has a full-time job as a sales manager and also has three kids ages 8, 6, and 5. She is very career-driven and wants to climb the corporate ladder in order to be able to provide better for her family. On the other hand, she loves her kids and would love the opportunity to spend more time bonding with them in a meaningful way. Her job is also very high stress so spending time with family is a great way to relax after a hard week at work. Since her time with them is limited she wants to use it in a fun and educational manner. They are mostly introverts so they like to spend time at home together rather than going out. As a family, they love watching movies together but have already watched all of the big popular ones. These are the only ones they know about because they are the ones other parents are constantly talking about. The problem is that those big popular movies don't really come out that often. Her 8-year-old daughter doesn't like the watch the same movies over and over again so they are always on the lookout for new interesting movies to watch. They like to help local and smaller businesses as it allows them to make a positive impact. Rose would love to be able to watch movies from a platform that highlights unique points of view so that she can introduce them to her kids.

<magic happens>

Rose is able to watch movies that have new and interesting perspectives on an assortment of topics with her family. There are several genres to pick from and they can pick the best fit for them based on how others thought the movie was. The entire family loves bonding on Friday nights when they all sit down to watch an indie film together. The wide variety of unique content allows them to do the same movie-watching bonding activity but have it feel new and different each time. They love how easy it is to use and how convenient of a platform it is. Since Rose is such a busy mom the ease of use is a big draw that ends up saving a lot of time. It has become a part of the family routine to do this every week together which allows them to have better structured time together. Having this structured time together where there is no pressure in finding a movie has allowed them to form a deeper easily

organized bond with each other. The parents like that their kids are able to enjoy a wide variety of movies from unique perspectives.

Rational:

This scenario provides sufficient information for the requirements construction because I followed the SPICIER rule when constructing my scenario. By following the rule, I made sure that the scenario was ideal for collecting information about the requirements construction. Additionally, the scenario makes sure to set up a scene in which there is a clear problem identified, and then through the use of HAL which is the <magic happens> section, there is a clear solution to the problem. The solution doesn't include any specific details about how the problem was solved but it does showcase what the issues were and how they no longer exist. Since we now know what the problems used to be and what will be needed to do in order to no longer make them problems those can be used to create the requirements. There are also lots of information about emotion and feeling to rely on when coming up with the requirements. These will be helpful as the requirements can be tested to see if they do in fact bring out these ideal emotions as a way of testing effectiveness.

User Scenario 2: Brandon gains exposure and success in the film industry.

Brandon is an up-and-coming independent film director. He has a wife and kids at home who all enjoy his movies. His favorite thing about making films is showing them to his kids. He enjoys making nature movies and is currently looking for his next big story. One day, Brandon would like to win an award for a movie that he has directed himself, but he has been struggling to gain attention in the industry. Brandon recently finished making one of his films and looking for ways to attract an audience and gain feedback on his work. He feels that as an independent director, he is at a disadvantage compared to other people, but he wants to stay independent. Could he expand his audience in the industry while staying independent?

<magic happens>

Shortly after finishing his independent film, Brandon was able to release his film and start gaining traction by using the streaming service HAL. Brandon could better reach out to his target audience by using a service-specific for independent film directors. By reaching this audience he could start gaining attention from viewers who enjoy similar work. As a director, Brandon was also able to see reviews, ratings, statistics, and other feedback that he could use. Brandon feels like this is exactly what he needed and can now use the feedback and the new audience to help him succeed in his career as an indie film director.

Rational:

This scenario gives information on requirement construction because it shows a story that will likely be happening to people who want to use our service. Based on the scenario we can see different requirements we will need. We will need a way for indie film directors to have access to the streaming service even if they aren't well known. It is also critical for HAL to keep statistics on user feedback such as ratings for the films. This will help filmmakers understand what users like seeing so they can adapt.

User Stories:

US1. As an indie film enthusiast and HAL user, I want to be able to browse through the movie catalog effortlessly so that I can pick a movie quickly without being indecisive.

US2. As an indie film enthusiast and HAL user, I want to be given movie recommendations based on my preferences and movies I've previously watched.

US3. As a parent and HAL user, I want to be able to start a subscription so that I am notified of the monthly billing.

US4. As a parent with kids and HAL user, I want to be able to see what other people thought of a movie before I let my kids watch it so that I know it is appropriate for them to view it.

US5. As an indie film enthusiast and HAL user, I want to be able to get recommendations for indie movies based on the indie movies I have watched and rated highly in the past so that I get the best recommendations possible.

US6. As an indie film director and HAL user, I want users who watch my movies to be able to see all of the movies I have directed that are available on HAL because if they like one of my movies, they will easily be able to see others that I have directed.

US7. As an action and comedy indie film enthusiast and HAL user, I want to be able to see all of the indie movies that are from these genres separately so that I only have to see movies from genres that I am interested in.

US8. As a parent with kids and HAL user, I want to be able to look at the history of all of the movies my kids have watched when I wasn't watching with them so that I can make sure they are viewing appropriate content.

US9. As a parent with kids and HAL user, I want a user-friendly interface so that my kids could use it on their own.

US10. As an indie film director and HAL user, I want to be able to view indie film ratings to see how my film is perceived by the audience.

US11. As an indie film enthusiast and HAL user, I want a wide variety of films so that I can learn more about the film industry.

US12. As an indie film enthusiast and HAL user, I want to use a streaming service for only independent films, so that I can find a lot of independent films and directors

US13. As an independent film director and HAL user, I want to share my movies and make money, so that I can fund future projects and improve.

US14. As an indie film enthusiast and HAL user, I want to be able to watch indie movies with my friends without physically being together to watch it on the same screen.

US15. As an indie film enthusiast and HAL user, I want to be notified when new indie films are being added.

US16. As a full-time single parent with kids and a HAL user, I want to resubscribe instantly if ever I cancel my subscription or forgot to pay for it.

2.3 Systems Requirements (Functional and Non-Functional)

Functional requirements:

FR1. The system stores data of all of the movies watched by the user in order the of films that are currently being watched. **(US8)**

FR2. The system should recommend movies that are trending and popular based on the number of streams. **(US11)**

FR3. The system must show the rating each movie has on a five-star scale. **(US1)**

FR4. The system must have a continue watching section where all of the movies that have been started but haven't been finished are listed. **(US8)**

FR5. The system must allow subscribers to post reviews of movies they have watched. **(US5)**

FR6. The system must allow subscribers to view and sort all of the reviews posted on a movie. **(US4)**

FR7. The system must give users recommendations based on the movies they have previously watched. **(US5)**

FR8. The system should incorporate user ratings when giving recommendations of movies. **(US5)**

FR9. The system could list out all of the movies by a particular director when the user clicks on the name of a director. **(US6)**

FR10. The system must know all of the genres of each of the movies in its catalog. **(US7)**

FR11. The system must be able to filter movies based on the genres requested by the viewer. **(US7)**

Nonfunctional requirements:

NR1. HAL's interface should look organized and consistent on different menus by maintaining the same UI/UX across the entire site. **(US9)**

NR2. If there is any potentially triggering or harmful content in the movies then a warning should be displayed for the first five seconds after clicking the play button before the movie begins. **(US7)**

NR3. HAL should properly proportionate interfaces based using pixel counts on both mobile devices and desktops. **(US9)**

NR4. Users should be able to create an account and subscribe in less than 5 minutes. **(US3)**

NR5. Each page of HAL should be loaded within 3 seconds. **(US3)**

NR6. The movie recommendation algorithm should be updated with new information each time a movie is watched, rated, or reviewed by a user. **(US2)**

NR7. Movie directory profiles should be updated at the end of each week to ensure that they display the most up-to-date information on each director. **(US6)**

NR8. The movie genre database should be updated every 24 hours to make sure that the most up-to-date tags are available on all movies. **(US7)**

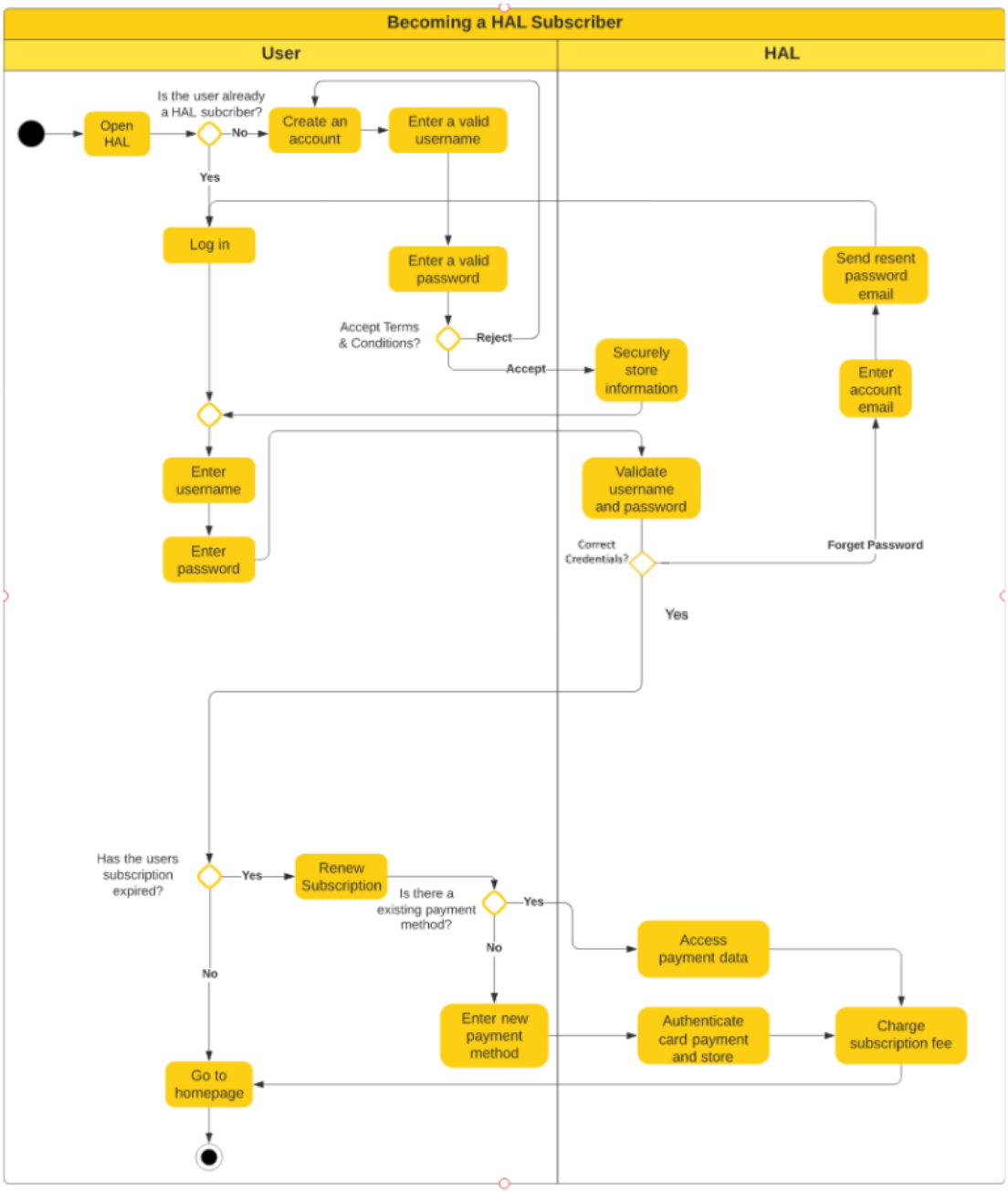
NR9. Information about films that have been watched and watch time in hours from the last year should be stored and visible to users. **(US5)**

NR10. Users should be able to create and start a subscription in less than 5 minutes. **(US16)**

Section 3. Activity Diagrams and Architecture

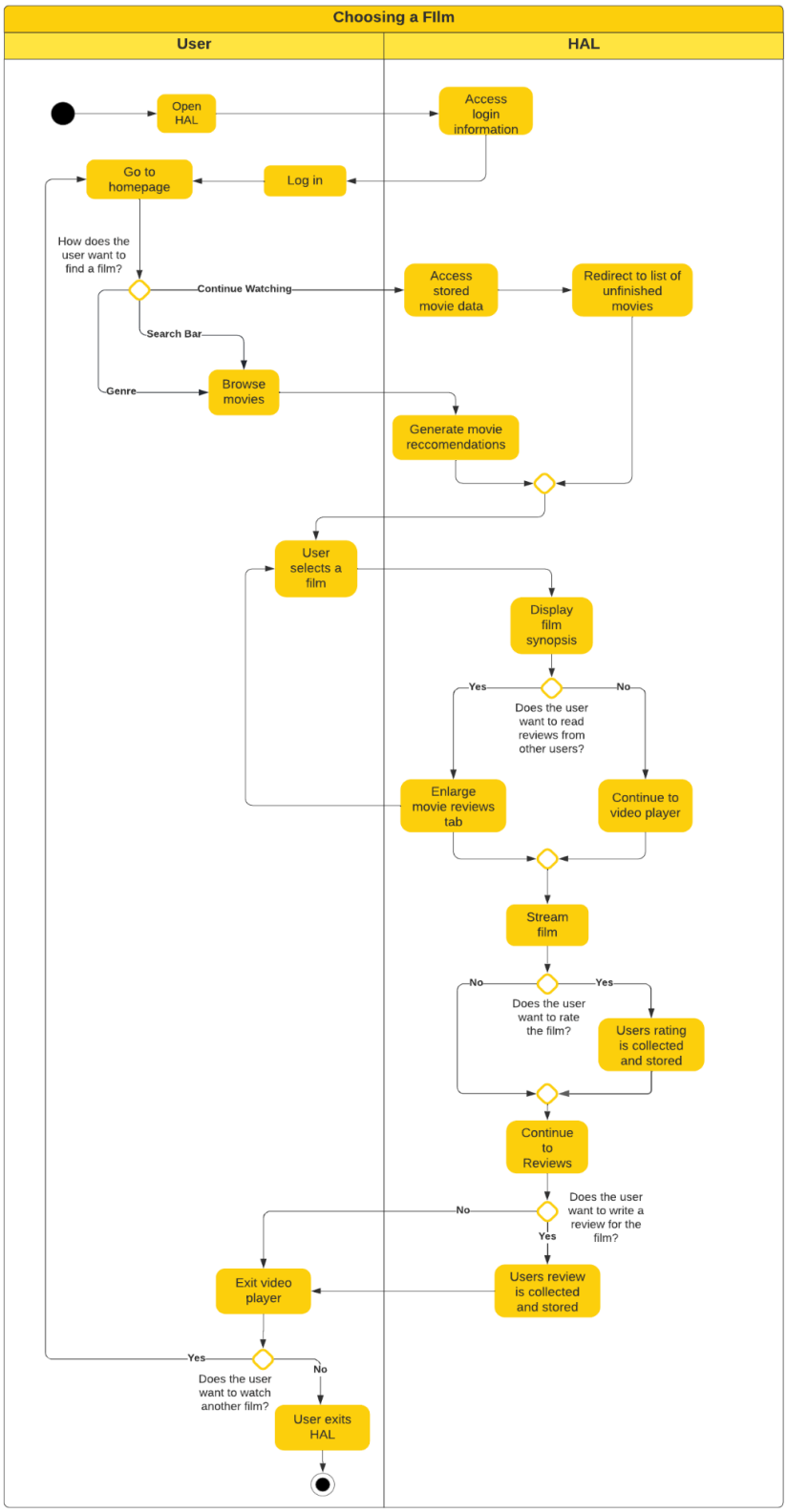
3.1 Activity Diagrams

Activity Diagram 1:



In this diagram, you'll see the visual of the process of creating an account and securing its subscription with HAL. The system's homepage will ask the user "*Is the user already a HAL subscriber?*" If the user presses no, the system will direct the user to create an account. The user must provide his username, password, and accept the legality terms so that the user's information will be stored in the system database securely, then the system will go automatically to the *Log-in* page. If the user presses yes, then the system will go directly to the *Log-in* page. After entering the user's username and password, the system would securely validate if there's a match of the account that has been entered by the user in its database. If there's no match, the system will let the user know that the account that has been entered is false, so then the system will suggest the user either create a new account or go to the system's *Forgot Password* page whereas the user will enter the email address that is associated with the account and will retrieve the user's password. If log-in succeeds, the system will detect if the account is subscribed or not. If the account is subscribed, the system will go directly to the *Features Homepage* where the user can access HAL contents. But if the account is not subscribed then the system will ask the user to *Subscribe* or *Renew Subscription*, if the user entered yes, the system should detect first the existing payment method, if the payment method is rejected then the user would be directed to the *Payment Method* whereas the user sets up a payment method that will keep the subscription active. After the system detects account subscription inactive then the user will be directed to the *Featured Homepage* where he can start accessing contents. The system's complexity is quite easy and very user-friendly so that many users can access HAL without any hassle. (US9)(US16)

Activity Diagram 2:

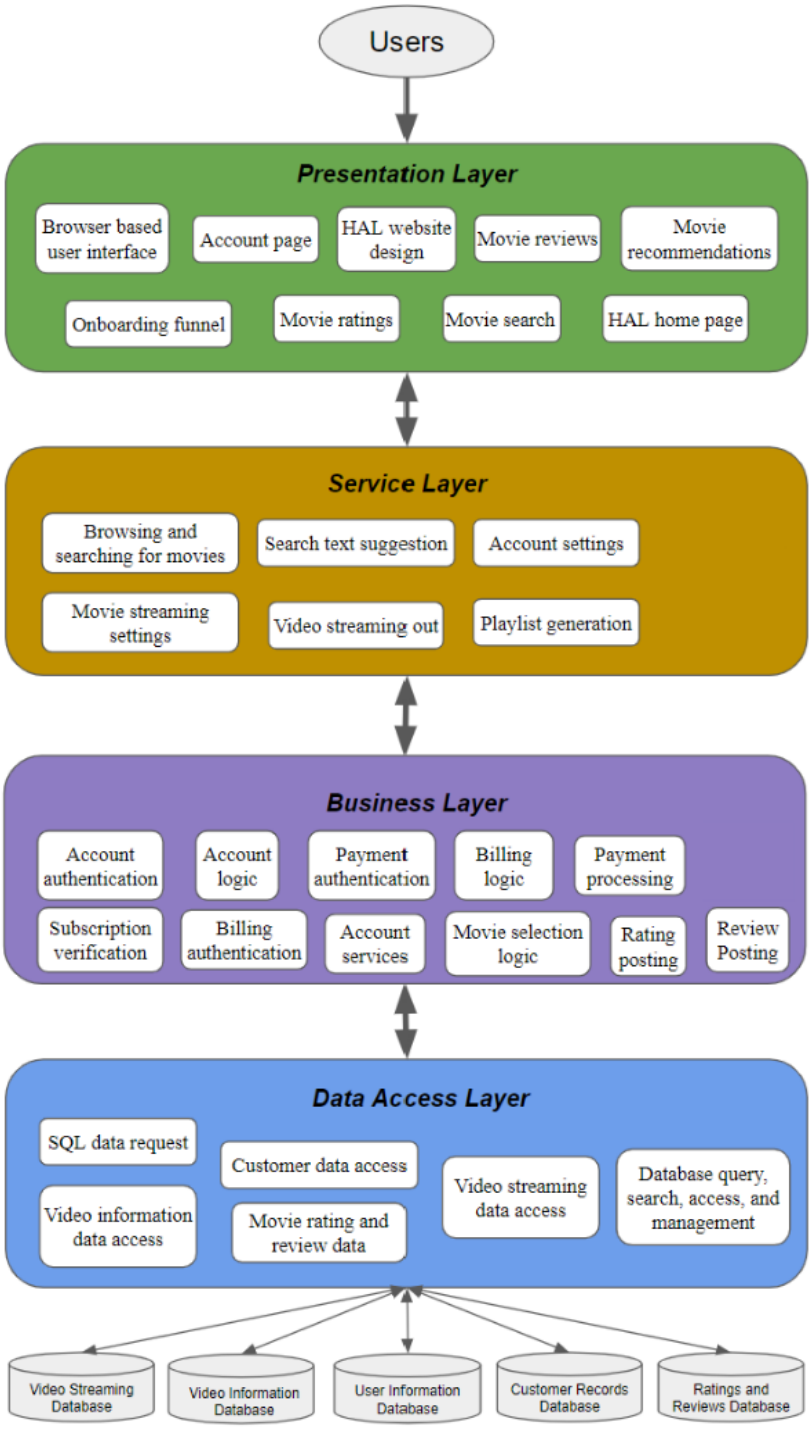


This activity diagram depicts the process users go through when looking for a movie to watch on HAL. To begin looking for a movie the user must be a current HAL subscriber and to verify this the user is required to log in with a valid username and password. Once the user is logged into their account HAL opens up to the homepage from which users can look for the movie they want to watch. The three main ways to find a movie are to look at their continue-watching list, search for a movie, and browse all of the movies by genre. The continue watching list is a complete list of movies that the user has started but hasn't finished. The search bar can be used if the user has a particular movie in mind and wants to see if it is on HAL. The browse option is for users who don't know what they want to watch but want to check out their options. The movies are categorized by genre so if a user knows they want to watch a particular kind of movie it becomes easier to find. HAL also generates movie recommendations for the user based on the movies they have watched in the past and the ratings and reviews they have given movies. Once a user selects a movie a synopsis of the movie along with its rating and top reviews are displayed. If the user wants to look at more reviews they can do so and all of the reviews of the movie will be displayed. If the user decides to watch the movie it will begin playing. Once the movie has been finished the user will have the choice to rate and review the movie if they want to. If they do decide to rate or review the movie then that information will be collected and stored. After that, the video player will be exited and the entire process will begin again if the user wants to watch another movie. Otherwise, the user would be finished with their experience on HAL and proceed to leave the website.

The first user story was incorporated in this activity diagram as we include recommendations set where the user's past movies, ratings, and reviews are taken into account to give out movie recommendations. The third user story is also included in the diagram because all of the movies are sorted into different genre categories and can easily be browsed. User story four is incorporated as the history of movies watched can be found under the continue watching watchlist. User story five is also included as kids would easily be able to find the show they are looking for by searching it up and if they

were already in the middle of a show they could easily continue watching it. Functional requirements 1, 2, 3, 4, 6, and 7 were taken into consideration when creating this activity diagram.

3.2 Architecture



Description and Justification of the Architecture:

The layer architecture we chose to represent HAL consists of 4 different layers, the presentation layer, service layer, business layer, data layer and a database layer that is separated from them.

The presentation layer typically contains the graphical design of an application and any code that handles user interaction. For HAL, this layer consists of things that the end-users typically see. Each of these components represents the user interfaces and client-side functions required for HAL and these will be implemented through code and user interaction.

The service layer is made up of components that manage HAL's video streaming services through stored user information. We relied on our user scenarios as a group to develop these as they are crucial to the features in the presentation layer.

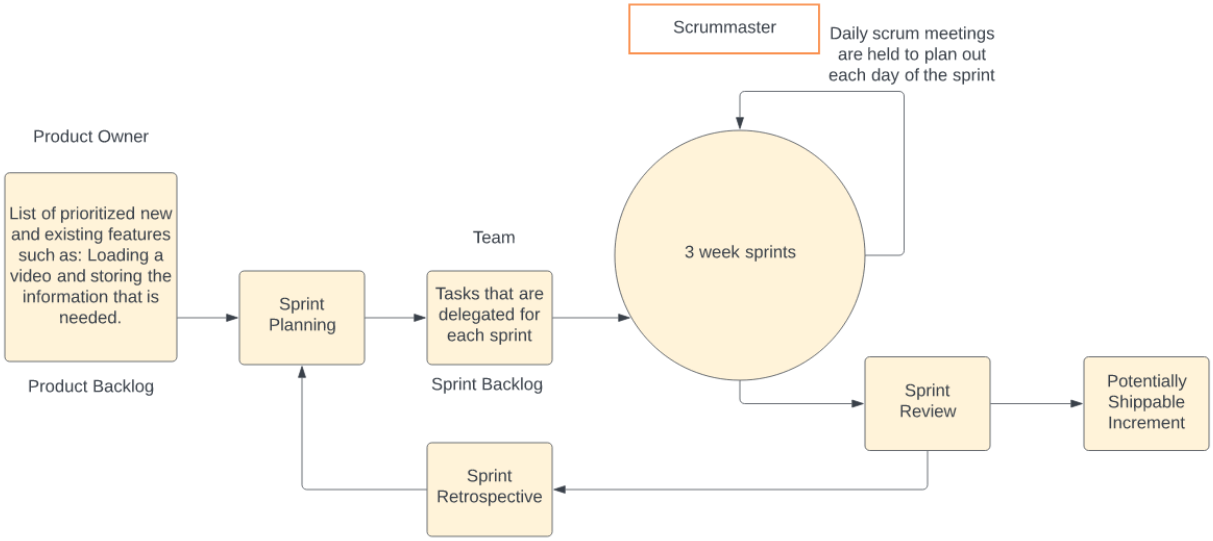
For the business layer, we included components that relate to our business problem. Each of the components is a model and logic that are specific to video streaming services like HAL. Authentications are critical business functions as HAL requires things like payment for their services.

The data access layer consists of components that are accessible to the user. In this layer, we incorporated things like movie rating and review data and video information as they should be accessible to the user.

Section 4. SDLC Process

4.1 SDLC Selected

The SDLC model we selected was the SCRUM model. Scrum is a popular agile approach for product development, particularly software development. Scrum is a project management methodology that may be used on any project with tight deadlines, complicated requirements, or a high level of uniqueness. Projects in Scrum are progressed through a series of iterations known as sprints. Each sprint usually lasts two to four weeks. In our case, the sprints will last up to 3 weeks.



Given the rapidly changing state of streaming technology, the ability to build the HAL project quickly and with design flexibility is essential. The following entails our justification of using SCRUM for the HAL service:

- Highly iterative, allowing for design analysis at each level.
- Requirements are fluid and will need to be revisited from time to time.
- A more collaborative approach with a high level of consumer interaction
- Is able to adjust to changes. Because the scope is specified for shorter release deadlines, the cost of a modification is reduced.

- Designed for use in a fast-paced development environment or in industries that require continuous output.

The development time for the HAL service should be shorter than a year, as the service has to be released soon so that it may begin to increase its user base. Given the requirements for the service, we decided on the following time-frame:

- 5 3-week sprints

4.2 SDLC Stages: Deliverables, Duration

	Sprint 1	**Sprint 2**	**Sprint 3**	**Sprint 4**	**Sprint 5**
	Project Front End	**Film Catalog**	**Search Functions**	**Review System**	**User-generated content and recommendations**
Team 1	User Login	UI Integration	Search by Title	Database of reviews	Continue Watching Section
Team 2	UI and UX	Database of Indie-films	Search by Popularity	Graphics and UI	User Recommendations Section
Team 3	Account Creation	Catalog Browsing	Search by Genre	Input of User reviews	Database for when users stop watching
Team 4	PaymentSystem	Film Request System	Search by Director	Averaging user ratings	Update user history of what films have been watched

From Figure 2, it is shown that our project would consist of 4 development teams that will each work on a deliverable for each sprint. By the end of the first sprint, the teams will decide if adjustments must be made for each team based on the progress that has been made.

Top priority items of product backlog:

- Search Function
- Film Catalogue
- Review System

- User-Generated Content

Section 5. Testing Approach

5.1 Acceptance Testing Approach (2 scenarios)

(i) Description of Stakeholders (involved in Acceptance Testing)

Actor 1: HAL Subscriber - These are the individuals who will use and test the streaming service. This solution is being designed for them, as they are our key customers and audience.

Additional Stakeholders:

Indie-film directors - These are the people who aren't necessarily using our service to watch films. Film directors, whether big or small, provide films for our audience to better enjoy our streaming service that carries a variety of movies.

Employees - They will develop the website to fit the system requirements like the user interface.

Finance friend - She is the one that came up with the project idea and is the one funding the project.

(ii) Pre-Conditions: *conditions from which the user is about to start the interaction with the system*

- The user has either a monthly or annual subscription to the streaming service.
- The user has logged into their account and is ready to search through the catalog and watch a film.

(iii) Testing Sequence

User's process of watching an indie film on HAL:

Step #1:

Testing Outcome of Step #1:

The user searches the URL of HAL's website.

testing outcome: Since the user has been on this site before, credentials are saved and the user is automatically redirected to HAL's homepage.

Step #2:

Testing Outcome of Step #2:

The user decides to browse films by popularity and clicks on "Popular".

testing outcome: The user is led to the next window which displays the catalog of most-streamed films on HAL.

Step #3:

Testing Outcome of Step #3:

The user scrolls through 50 different indie films and clicks on the next page.

testing outcome: The user is led to a new window that displays another page of indie films.

Step #4:

Testing Outcome of Step #4:

The user clicks on a film that has an appealing title and film poster.

testing outcome: The user is redirected to the movie synopsis page that displays typical information about the film (Synopsis, maturity rating, director, cast, etc.).

Step #5:

Testing Outcome of Step #5:

The user wants to learn about the director of the film and clicks on "Directors Name".

testing outcome: The user is led to a new window that displays the director's name, movies, overall rating, most popular reviews, and the films that they have worked on that are available on HAL.

Step #6:

Testing Outcome of Step #6:

The user wants to read reviews of other HAL users and enlarges a “reviews” tab.

testing outcome: HAL opens a pop-up window that displays the top voted reviews of previous HAL user’s

Step #7:

Testing Outcome of Step #7:

The user clicks on “Close”.

testing outcome: The user closes the reviews window and is back on the movie synopsis page.

Step #8:

Testing Outcome of Step #8:

The user clicks on “Return To Movie”.

testing outcome: The user is redirected back to the movie synopsis page.

Step #9:

Testing Outcome of Step #9:

The user clicks on “Play Movie”.

testing outcome: HAL opens a video player and the film starts playing.

(iv) Post Conditions

- The User exits the video player.
- The User’s data of watching this film is recorded in the system.
- HAL increments streaming numbers and stores the information into its system.
- The User is given the option of giving the film a rating/review.
- HAL receives and processes the user’s review.

- HAL displays other films that are similar to the one that was just watched (generated through genre and directors).
- The User goes back to the homepage and continues to browse for more films to watch.

5.2 Unit Testing Plan (Blackbox Testing)

Creating a HAL Subscription (registering an account on HAL)

Typical Value Test

a) Username must not include any part of the user's first name, last name, or email address.

Outcome: If present, reject and tell the user that the username cannot consist of your first name, last name, or email address.

b) Password must have at least 1 number and 1 special character (possible special characters: !, @, #, $, %, &, and *).

Outcome: If missing, reject and tell the user password must contain at least 1 number and 1 special character.

c) The user's credit card information must match bank information.

Outcome: If inputted incorrectly, reject and tell the user that their bank information is incorrect.

Boundary Value Test

a) The username has less than 5 characters.

Outcome: Reject and tell the user to input more than 5 characters.

b) The password has less than 8 characters.

Outcome: Reject and tell the user to input more than 8 characters.

c) The user's entered age is under the age of 18.

Outcome: Reject and tell the user that users must be at least 18 years old.

5.3 Integration Testing Plan

Bottom-Up

- Unit testing starts with a single application that will mostly utilize automated testing to look for flaws in this portion of the system.
- New tests will be performed to ensure that no more faults developed as a result of the previous issues being fixed.
- Multiple programs will be connected together when unit testing is completed to examine how they interact.
- If any mistakes are discovered, they will be corrected, and new test routines will be created in order to continue testing the connected applications.

Modules being tested:

1. System log-in
2. Accounts
3. Billing system
4. User analytics

Testing Branch: Making a HAL account

1. To start off, users must first create an account in order to be able to have access to the HAL catalog of Indie films.
2. Test to see if criteria are met for usernames and passwords. Usernames must not include the user's first name, last name, or email address. Usernames must also be 5 or more characters. Passwords must be 8 or more characters, consisting of at least 1 number and 1 special character.
3. Test to see if billing information is set up correctly. If billing information does not match up with their bank account, inform the user that their information is incorrect.

Final Test

4. Once an account is set up and billing information is entered, users should have access to the HAL catalog.

Section 6. Team Description

To successfully implement HAL, a video-streaming service, we are following the scrum model which is an agile methodology. We plan to have a total of 15 members, of these members the necessary roles will be included, roles such as the Scrum Master, Product Owner and Development Team Member. We will have three product development teams that are all made up of 3 developers. We will also designate at least one senior developer to each of these groups as they will have the experience and knowledge to guide the development group.

The projected project time will be four months, and within that there will be five 3-week sprints. At the end of a sprint, members of each product development team will demonstrate the working software they have completed. The Scrum Master can then decide if resources need to be diverted to specific teams. If there are not enough resources to be split amongst the teams, additional developers may be brought on.

Throughout the proposed process, product development teams, the Scrum Master, and Product owner will all be able to communicate with each other. The Product Owner will be the only one to communicate with our stakeholders as those are people with interest in the product.

Responsibility Matrix:

To keep our project organized, HAL will use a detailed matrix that helps scrum roles identify their specific responsibilities. The Product Backlog is owned by only the Product Owner. The Sprint Planning is owned by both the Product Owner and Development Team. The Daily Scrum is only owned by the Development Team. The Product Increments are only owned by the Development Team. The Sprint Review is only owned by the Product Owner. The Sprint Retrospective is owned by all three scrum roles.

RACI Matrix	Product Owner	Scrum Master	Development Team
Product Backlog	Owns	Helps	Helps
Sprint Planning/Backlog	Owns	Helps	Owns
Daily Scrum	Helps	Helps	Owns
Product Increments	Helps	Helps	Owns
Sprint Review	Owns	Helps	Helps
Sprint Retrospective	Owns	Owns	Owns

Section 7. Conclusion

By using the Scrum SDLC for the proposed HAL project, we can increase productivity and allow workers to work more effectively and efficiently to produce a reliable and easily adaptable streaming service software. HAL will provide customers with a personalized user experience, a large variety of indie films, film reviews, and recommendations based on films they enjoy. The benefits of HAL include a reliable streaming service, a low cost, and a variety of indie films to discover. These benefits will allow us to stand out against other streaming platforms and gain a following in a specific niche. In the future, HAL may add implementations that may include a more advanced recommendation system, expanding to movies in different languages, or more ways to review films.