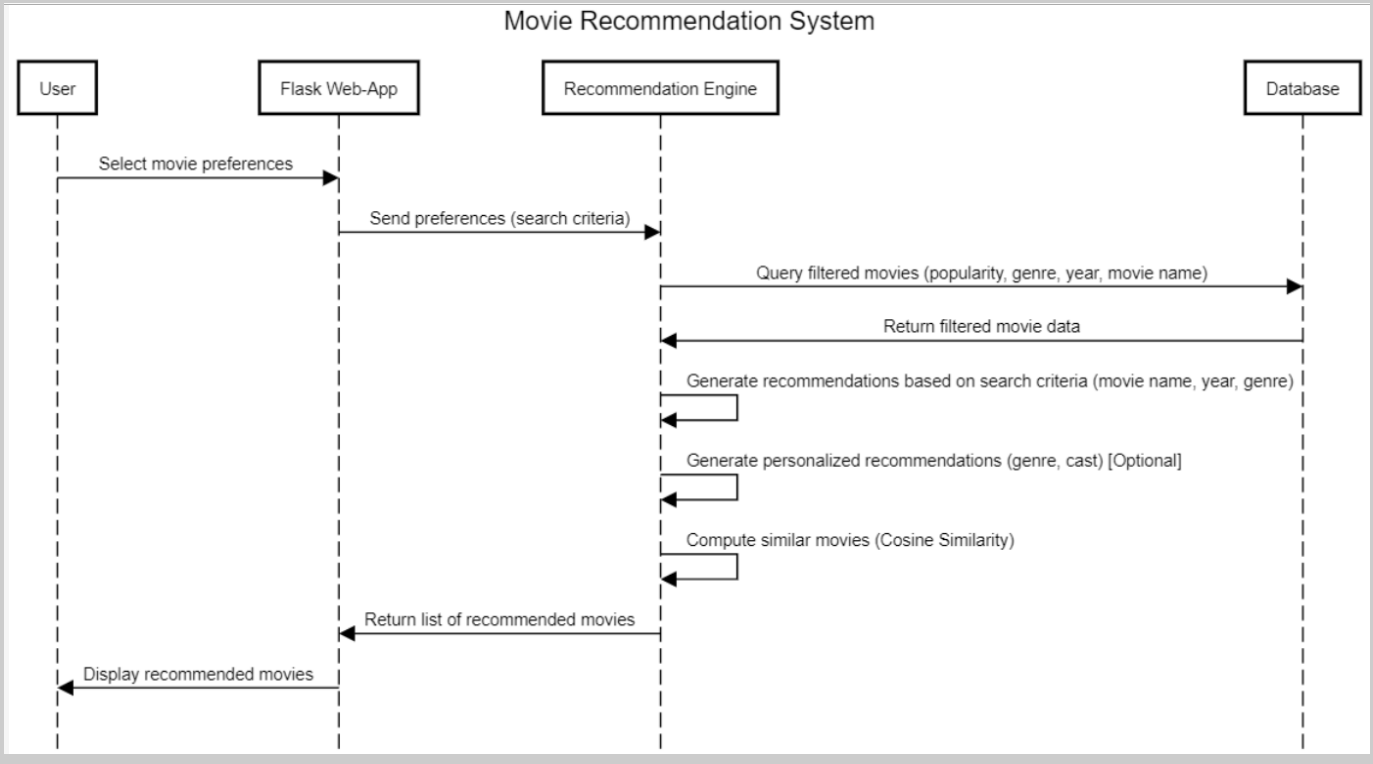
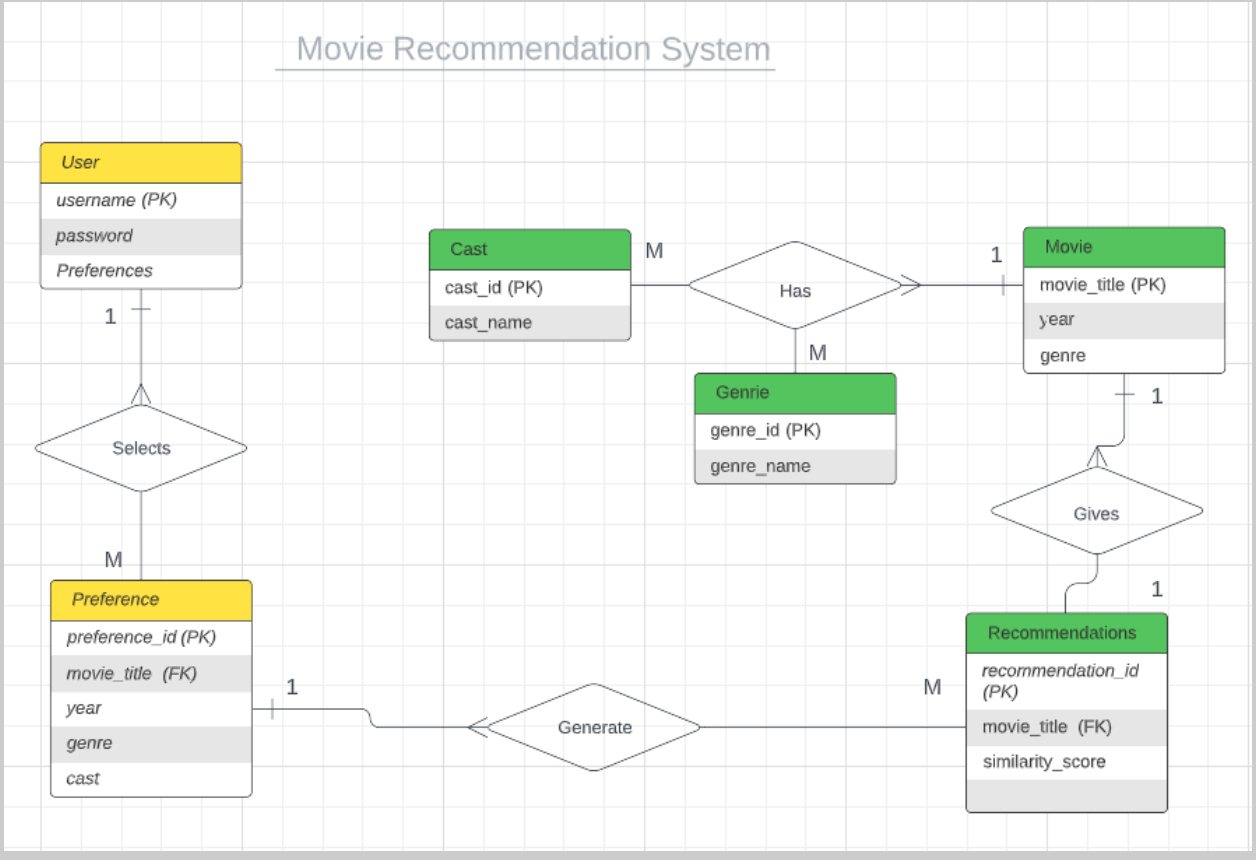
★Complete Sequence Diagram:



❖ *Overview of the steps in the sequence diagram:*

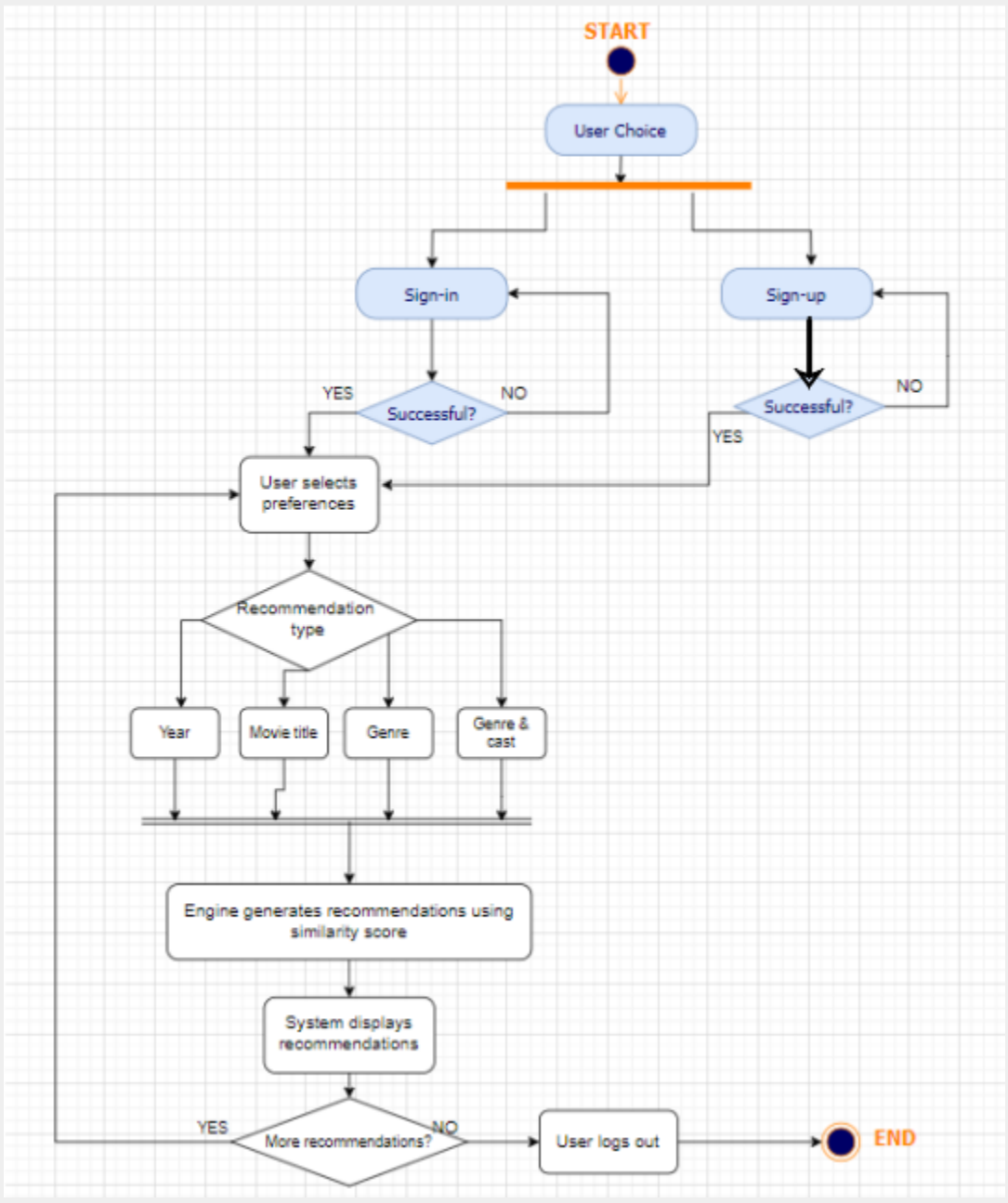
1. User selects movie preferences.
2. Flask Web-App sends preferences to the Recommendation Engine.
3. Recommendation Engine processes the user preferences & queries the db for movies filtered by title, genre, cast and year.
4. Database returns the filtered movie data.
5. Recommendation Engine generates personalized recommendations based on the user's choice.
6. Recommendation Engine computes similar movies using Cosine Similarity.
7. Recommendation Engine returns a list of recommended movies to the Flask Web-App.
8. Flask Web-App displays the recommended movies to the user.

★Data Association Diagram: (ERD)



The relationship between User and Preference is one-to-many (1:M), as one user can select multiple preferences. Similarly, the relationship between Preference and Recommendations is one-to-many, as one preference can generate multiple recommendations. The relationship between Recommendations and Movies is one-to-one (1:1), as each recommendation corresponds to a single movie. For Movie-Cast and Movie-Genre relationships, the cardinalities are one-to-many, as a single movie can have multiple cast members and belong to multiple genres. Moreover, different tables were made for genre and cast because they are multi-valued. As for preference, users can get 4 different types of recommendations according to movie title, release year, genre or genre and cast, therefore, a different table was made for preferences as well.

★Complete Activity Diagram:



This activity diagram provides a visual representation of the different steps involved in the movie recommendation process, from logging in or signing up to receiving and displaying recommendations based on the user's preferences.

1. Start: The workflow begins.
2. Fork: User chooses an action (Login or Sign Up).
3. If the user chooses to log in, the workflow proceeds to step 6. If the user chooses to sign up, the workflow proceeds to step 4.
4. User signs up: The user enters their information to create an account.
5. Is the sign-up successful?: The system checks if the sign-up information is valid. If yes, the workflow proceeds to step 8. If no, an error message is shown, and the workflow returns to step 4.
6. User logs in: The user enters their login credentials.
7. Is the login successful?: The system checks if the login credentials are valid. If yes, the workflow proceeds to step 8. If no, an error message is shown, and the workflow returns to step 6.
8. User selects preferences: The user decides the type of recommendation (Movie Title, Genre, Year, Genre and Cast):. The workflow proceeds to the corresponding step based on the user's choice.
9. Join: System displays recommendations to the user: The system shows the generated recommendations to the user.
10. Does the user want more recommendations?: The user decides if they want more recommendations. If yes, the workflow returns to step 8. If not, the workflow proceeds to step 11.
11. The user logs out of the system.
12. End: The workflow ends.

★Comprehensive Report on GUI:

Introduction: The application is designed to offer personalized movie recommendations based on user preferences, such as genre, cast members, release year, and movie title. The GUI is aesthetically pleasing and allows users to navigate through the system easily accessing various features that enhance the overall user experience.

Overview of the GUI: The Movie Recommendation System's GUI consists of multiple pages, each with a specific function: a) Homepage: The homepage serves as the entry point for users and provides an overview of the application's features. b) Choices Page: The choices page allows users to customize their movie recommendations by selecting three genres and five cast members. Upon selecting their preferences, the page provides a personalized experience by presenting users with movie suggestions that closely align with their preferences. c)MovieMatchMaker: On this page users can choose to receive recommendations based on:.

1. Genre: This option provides users with movie recommendations belonging to their preferred genres.
2. Release Year: Users can obtain movie suggestions from a specific release year, allowing them to explore films from various time periods.
3. Movie Title: This feature enables users to find similar movies based on a specific movie title.

First Level Testing: In addition to the above features, first-level testing has been conducted on the GUI to ensure that all elements are functioning properly. This testing involved clicking on various buttons, menus, and other interactive components to verify that they are responsive and working as intended. The first-level testing has further confirmed the user-friendly nature of the application, as well as its reliability and performance.

Conclusion: With its intuitive design and robust functionality, the Movie Recommendation System's GUI effectively serves its purpose of providing an enjoyable and personalized movie discovery experience for its users. The system's features, such as the choices and recommendations pages, ensure that users receive tailored movie suggestions that cater to their unique preferences.