

SOFTWARE REQUIREMENTS **SPECIFICATIONS DOCUMENT FOR** **SINGALONG**

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1.- Introduction

1.1.- Purpose

The main purpose of this Software Requirements Specification (SRS) document is to provide an overview of the software requirements for the SingAlong company proposed by the OurCode software development team.

The document aims to outline the functionality, behavior and features of the system helping all involved parties to understand the project. It is essentially a communication tool between the developers, the client and the stakeholders. For the developers it works as a clear picture of the scope of the software development and is used as guidelines. Clients and stakeholders can ensure that their requirements are correctly incorporated into the project.

1.2.- Scope

The software project is an innovative web-based application designed to transform how music is distributed and consumed, especially focusing on a new way of interaction between consumer and artist, getting them closer than ever.

This program will help achieve these aims by offering a variety of features and services to both artists and customers. By removing intermediaries, SingAlong intends to lower consumer expenses while increasing the money that artists earn from their work, fostering a more sustainable music ecosystem. Artists can also design their own album pricing system. The portal will include search options, personalized album creation, top lists, artist notifications, and a contribution method to users. The site will allow musicians to post their songs, make albums, and send promotional material. Also consumers will have access to free song samples to listen to, purchase complete albums cheaply and give their feedback to artists directly.

Clearly this app represents a paradigm change in the music industry by promoting independent musicians instead of the biggest ones.

1.3.- Glossary

This section defines and explains significant vocabulary, acronyms, and abbreviations important to comprehending this document:

- **Song:** It is a short piece of music for singing. A set of songs compose an album.
- **Artists:** Users that can upload their music and create different albums. They receive money from selling albums and from donations.
- **Album:** Set of songs and video clips created by an artist that can be sold. It can be sold at some price given to different stakeholders such as artists and record labels.
- **Customers:** Users that can search for albums, artists to listen to. They can make donations, purchase albums, login,...
- **File:** It is a collection of music, videos, images,... there are several formats such as wav, mp3, png, jpg,...
- **Burn a CD:** It is a record of different songs IN A PHYSICAL CD.
- **Promotional material:** It is a collection of merchandise, flyers, TV announcements, banners, etc, they should be sent in png or jpg formats.
- **Commission:** A sum or percentage of money allowed to agents, etc., for their services, usually based on the value or price of what gets sold.
- **Community Manager(CM):** Is a person who carries out the company's social media.
- **Price:** Value that the customers pay for the album. It is split between the record label, and the artists.
- **Wav format:** is a specific format for audio that allows both, uncompressed and compressed data. Allowed formats to optimize quality.
- **Mp3 format:** is another specific format for audio that reduces the size of the file with some loss. It is not allowed in the whole environment since it implies constant compression and decompressions and its respective loss.
- **MPEG format:** i.e. Mp3 format.
- **Paypal:** a specific payment method. It is used as a valid method to make donations to the artists without commissions by the final users.
- **Performance:** is the overall rating that combines the outcomes of voting, the number of downloads and the number of sales. It is used in search and in listing methods.
- **USB memory:** external device for data storage. It is used to deliver too large files that are not possible to send in other ways.
- **Graphical interface:** is a program that works as an intermediary between the system and the user. It is mainly used by the human operator to enter new songs to the Web app from physical devices.

1.4.- References

[1] Drawing on the successful model of Spotify, which requires around 130MB of space excluding downloaded music, we anticipate our application's size to be relatively similar. However, we aim to streamline our app further, striving to be closer to the average most-used app size of roughly 60MB, as outlined by statistics from **[Statista]**(<https://www.statista.com/statistics/1296527/size-top-android-apps/>).

[2] Turning once again to Spotify as a benchmark, discussions on **[Spotify's Community]**(<https://community.spotify.com>) reveal that the app consumes around 600MB on average with hardware acceleration enabled, and about 150MB without it. Notably, Spotify's RAM usage averages around 8% of a device's total memory - a proportion we intend to bear in mind for our software.

[3] With the average size of a song estimated at 5MB, our system will cater to the needs of artists by accommodating songs that are up to twice the average length. This decision is rooted in providing ample flexibility to the artists while ensuring efficient use of our system's resources.

[4] We've also considered the minimum bit amount required for human auditory perception. This consideration will influence the quality of the audio output of our application, ensuring that it's not just technically sound, but also delivers a great user experience.

[5] In addition, we've considered the lowest optimal frequency required to cover the entire range of human hearing. This includes accounting for anti-aliasing, twice the range of human hearing (20Hz-20KHz). This decision is backed by **[Adobe's guidelines]**([https://www.adobe.com/uk/creativecloud/video/discover/audio-sampling.html#:~:text=The%20human%20ear%20can%20hear%20between%2020%20hertz%20\(20Hz\)%20and,rates%20to%20capture%20all%20sounds](https://www.adobe.com/uk/creativecloud/video/discover/audio-sampling.html#:~:text=The%20human%20ear%20can%20hear%20between%2020%20hertz%20(20Hz)%20and,rates%20to%20capture%20all%20sounds)) on audio sampling, ensuring that our application will deliver high-quality audio, regardless of the range of sound.

[6] Nielsen Music - "Music 360 Report": A comprehensive report on music consumption trends, user preferences, and streaming services. It can provide valuable insights for developing a music recommendation system.
<https://www.nielsen.com/us/en/insights/report/2021/music-360-2021/>

[7] TechCrunch - "How Spotify's Discover Weekly cracked human curation at scale": An article that explores Spotify's Discover Weekly feature and its success in leveraging algorithms for personalized music recommendations.
<https://techcrunch.com/2015/07/09/how-spotifys-discover-weekly-cracked-human-curation-at-scale/>

[8] Medium - "Building a Music Recommendation Service: A Deep Dive into Spotify's Discover Weekly": A detailed analysis of Spotify's Discover Weekly and the underlying techniques used for music recommendation.

<https://medium.com/@magerleagues/building-a-music-recommendation-service-part-1-afb6d3b96883>

[9] ACM Transactions on Intelligent Systems and Technology - "Collaborative Filtering Recommender Systems": A research paper that discusses collaborative filtering techniques commonly employed in recommender systems, including music recommendation. <https://dl.acm.org/doi/10.1145/2843948>

[10] International Society for Music Information Retrieval (ISMIR): The official website of ISMIR, a leading organization dedicated to advancing music information retrieval research. It provides access to research papers, conferences, and resources related to music recommendation systems. <https://www.ismir.net/>

1.5.- Overview

The sections of this SRS that follow will go into further detail on the software system that will be developed for SingAlong. By detailing the product viewpoint, important product features, user characteristics, and any restrictions or assumptions driving the system design, the product overview will give the necessary context for the project.

The section on particular needs will offer a full explanation of the system's functional and non-functional requirements, including its features and use cases. An appendix may be included as an option to give additional information or resources that may be useful in software development.

Overall, this SRS will lay a solid basis for the software development team to comprehend and design the necessary platform.

2.- Stakeholders

2.1.- Identified Stakeholders

- **Community Manager:** The Sing Along employees in charge of managing the social media accounts of the company, the CMs need information about the product to provide updated posts in social networks. They gather user feedback, monitor discussions, and identify trends and preferences. This information is valuable for the design team to understand user expectations, pain points, and desired features. The community manager's input helps ensure that the project aligns with user preferences and community dynamics. Hence they also have a word in the design of the project.
- **Promotional Team:** Similar to CM, the promotional team of Sing Along also needs the latest updates of the app to create the most optimal marketing campaigns to reach the target user. Their insights into user preferences, market trends, and competitive analysis are vital in shaping the design and positioning of the project. By understanding the target audience and their expectations, the promotional team contributes to the project's design choices, branding, and messaging. They are also responsible for updating the promotional material sent by the artists. For this reason, they must be implied in the design of the application as a stakeholder, since some of the aspects of that design may affect the way of promoting the product and on how successful can promoting be.
- **Lawyer Team:** The team responsible for all Intellectual Property rights conflicts at the same time that ensures that the company fits the local legislation and all the needed requirements to operate without problems. Their expertise influences the design by guiding decisions related to licensing agreements, content usage policies, and user rights, ensuring the project's compliance and mitigating legal risks.
- **Maintenance and Support Team:** An intermediary between the final user, artists and the company, while the first ones are solving problems in the background about possible issues with the environment of the app, the second ones work in the first-line with the final users issues and play the role as a link with the Maintenance Team if required. Through their interactions with users, they gather valuable feedback, identify usability issues, and suggest improvements. Their insights and recommendations influence the design team's decision-making process, enabling them to refine the application's usability and resolve user pain points.
- **Human Operators (mailing and burning):** Other more specific and not undefined roles such as the operator in charge of sending and burning the CDs of the physical copies to the ones who request them, the operator that is responsible for upload the heavy files that exceed the limit of the app and are sent as a CD or some kind of physical media. By efficiently handling physical media requests and ensuring accurate delivery, they provide valuable input on how the application can seamlessly integrate

physical media options. Their feedback helps improve processes related to physical media distribution and fulfillment. Although they may seem to have a secondary role in the software application, they could suggest really useful requirements.

- **Specialists for external software:** In this case, we talk about them in some use cases. That is, Software Engineers for developing new features in the website. External software specialists, such as software engineers, bring technical expertise and innovation to the project. Their involvement allows for the development of new features, enhancements, and optimization of the platform. Their suggestions and recommendations influence the design team's decisions regarding technical implementation, scalability, and performance, resulting in a robust and efficient application. Moreover, some external software for the payment methods must be applied, in this case about PayPal, thus the expert software team about that payment method must have considerations about the project on how to implement and connect Paypal with the application.
- **SingAlong Managers:** SingAlong Managers, as managers of the application company, play a crucial role in the design and development of the music application. Their involvement in the SRS document revolves around strategic decision-making and aligning the application's features with the company's goals and objectives. They provide high-level guidance and input to ensure the application meets the needs of the target audience and supports the company's overall vision.
- **Music experts:** Music Experts play a crucial role in the design of the music application, particularly in the Software Requirements Specification (SRS) document. They are highly knowledgeable individuals with expertise in music theory, composition, and industry trends. Music Experts contribute their deep understanding of music genres, artists, and user preferences to shape the application's features, content curation, and music recommendation algorithms. They provide guidance on implementing effective music player functionalities, playlist management, and music browsing features, ensuring a seamless and engaging user experience. Through their involvement in this domain, Music Experts help refine and enhance the application's music-related aspects, resulting in a comprehensive and immersive music experience for users.

2.2.- Stakeholder Responsibilities and Sections to Review

Once the stakeholders of the project are listed, as well as the main actors corresponding to each one of them, it is the suitable time to analyze the responsibility of each stakeholder in this SRS document and state what sections are suitable for what parties.

- **Community Manager and Promotional Team:** We put these two stakeholders together since their responsibilities and review sections in this SRS document are quite similar. They both must review the whole sections 1, 2, 3, 8, 9. Also, the community manager must review the subsection 4.2 and the promotional team the subsection 4.3. The other sections may be useful as well for the better understanding of the application in order to improve the promotional campaign and social media efficiency. Their main responsibilities are:
 - Verify the requirements related to social media integration and content management.
 - Review the specifications for marketing campaigns, user engagement, and analytics.
 - Provide feedback on the requirements related to promoting artists, albums, and events.
- **Lawyer Team:** They must review the whole sections 1, 2, 3, 8 and 9, as well as the subsection 4.4. They may also review the rest of sections to ensure that their legal approach is satisfied in the whole system. Their main responsibilities rely in:
 - Validate the requirements related to intellectual property rights and legal compliance.
 - Review the specifications for managing copyright claims and resolving disputes.
 - Provide feedback on the requirements related to privacy, data protection and terms of service.
 - Participate in the validation of legal aspects and ensure adherence to applicable laws.
- **Maintenance and Support Team:** They must review the whole sections 1, 2, 3, 4, 8 and 9. It could be useful to review the rest of parts, in order to ensure the adaptation of their needs to the system functionalities where they are not directly related. Their main contribution could be defined as:
 - Verify the requirements related to system maintenance, monitoring, and error reporting.
 - Review the specifications for the user support channels and issue resolution processes.
 - Provide feedback on the requirements related to system performance, scalability and reliability.

- Human Operators: They must review sections 1, 2, 3, 8 and 9 and subsection 4.1. They could also review the subsections related to purchasing an album, especially the specifications about the physical version of it. Their contribution should be in the following manner:
 - Validate the requirements related to physical media distribution and CD burning processes.
 - Review the specifications for handling user requests for physical copies of music.
 - Provide feedback on the requirements related to inventory management and shipping logistics.

- Specialists for external software: They must review sections 1, 2, 3, 8 and 9, as well as subsections 4.3, 4.4 and 7.3. Their contribution could be in the following grounds:
 - Verify the requirements related to integrating external software components or APIs.
 - Review the specifications for custom development or integration with third-party systems.
 - Provide feedback on the requirements related to software architecture and technical feasibility.

- SingAlong Managers: They must review the whole sections 1, 2, 3, 8 and 9, as well as the subsection 4.4. They may also review the rest of sections to ensure that their vision of the company is fulfilled. Their main responsibilities rely in:
 - Reviewing and approving the overall requirements of the music application outlined in the SRS document.
 - Providing input on the application's target market, positioning, and business objectives to shape the design and feature priorities.
 - Participating in defining the functional and non-functional requirements of the application, ensuring they align with the company's strategic direction.
 - Reviewing and approving the finalized SRS document to ensure it accurately represents the company's objectives and expectations for the application.

- Music Experts: They must review the whole sections 1, 2, 3, 8 and 9, as well as the subsection 4.4. They may also review the rest of sections to ensure that the general and technical requirements of the document accomplishes the desired musical functionalities. Their main responsibilities rely in:
 - Offering guidance on integrating music recommendation systems, ensuring accurate and personalized recommendations based on user preferences, listening habits, and music discovery algorithms.
 - Advising on the design and usability aspects of the application's music player, playlist management, and browsing features to optimize the user experience.
 - Reviewing and providing feedback on the SRS document's music-related sections to ensure accuracy, relevance, and alignment with industry standards.

A few remarks may be stated after deeply analyzing the necessary responsibilities or contributions of each stakeholder. First, it is trivial to observe that some of the “core” sections, those that were marked to review by all the stakeholders, include points from a wide variety of aspects, some of them affecting only a group of stakeholders. That does not mean that the stakeholders may review just one part of those sections, but they should review the entire section, since even though there could be parts not related to them, for instance, in the obscure points or functional requirements sections, all of them provide useful insights of the overall functioning of the system and explain different parts in which their vision as stakeholder could have some relevance. In this way, even if some stakeholders are not directly related with some obscure points or functional requirements, we have marked them to review those sections too, since they may have an indirect impact on some of those.

Moreover, a final remark is that the responsibilities or contributions stated are based on what each stakeholder should expect from this document. That does not mean that it is compulsory for all of them to do the tasks provided in the previous bullet points, but it acts as a guideline of what they should review and why should that affect them, providing indications on how they could be implicated in the SRS document with their respective stakeholder perspective.

2.3.- Actors

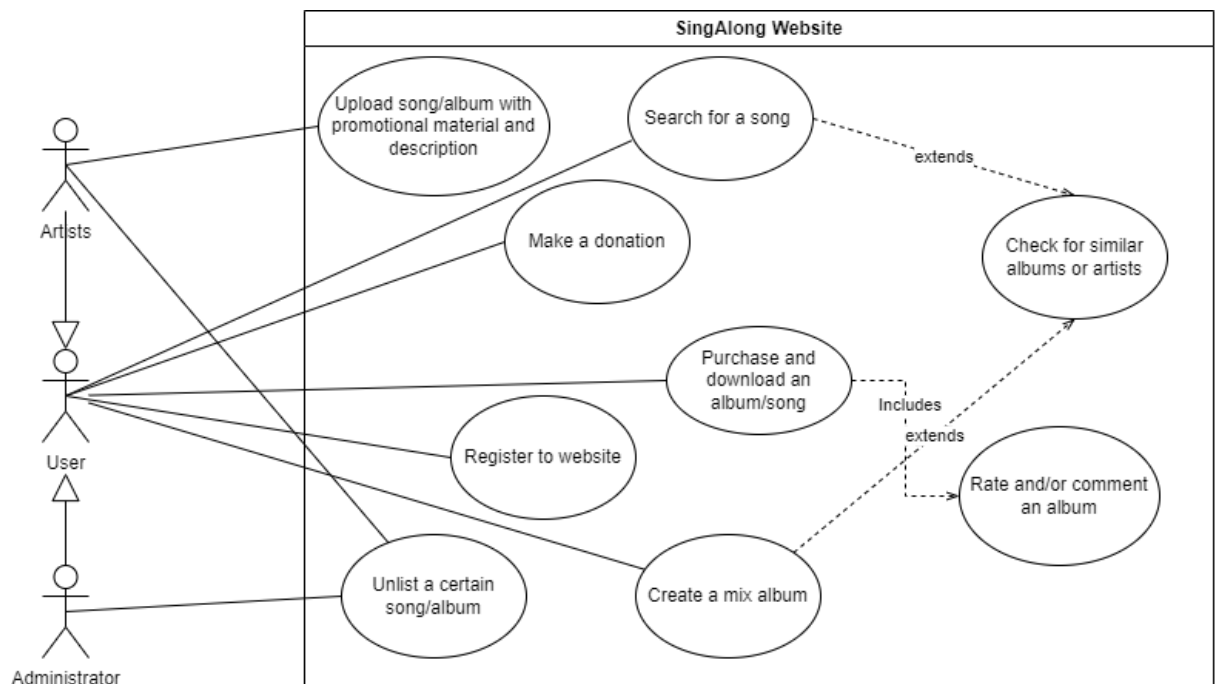
In software engineering projects, actors are key entities or individuals who interact with the system being developed. They represent the various roles and perspectives involved in the software development lifecycle. Actors play a significant role in defining the requirements of the system, particularly in the Software Requirements Specification (SRS) document. The SRS document serves as a crucial communication bridge between the stakeholders and the development team, capturing the functional and non-functional requirements of the system.

Besides that, the most important actors for each identified stakeholders are the following:

- **User:** The User is a primary actor in the music application and participates in various use cases. They are the end-users of the application and engage with its functionalities. The User can register on the website, make donations, purchase and download albums or songs, search for specific songs, create mix albums, check for similar artists or albums, and rate or comment on albums. The User's actions and feedback shape the overall user experience and drive the success of the application.
- **Artist:** The Artist is a specialized actor, representing musicians or music creators who engage with the music application. Artists share similarities with Users in terms of participating in most of the use cases available to Users. However, Artists have additional capabilities specific to their role. They can upload songs along with promotional material and descriptions, showcasing their work to the User community. Furthermore, Artists have the ability to unlist certain albums or songs, allowing them to manage and control their content on the platform.
- **Administrator:** The Administrator is another extension of the User actor, representing individuals responsible for overseeing and managing the music application. Administrators possess all the functionalities available to Users and share some similarities with Artists. In addition to these common use cases, Administrators have the authority to unlist specific albums or songs. This capability enables them to moderate the content, ensuring compliance with guidelines, addressing any copyright concerns, or managing any other administrative tasks necessary for the smooth operation of the application.

The User, Artist, and Administrator actors collectively contribute to the success and functionality of the music application. Their participation in the use cases outlined in the Software Requirements Specification document ensures that the system meets the needs and expectations of its various stakeholders. By understanding the roles and responsibilities of these actors, the development team can design and implement a comprehensive and user-centric music application.

3.- Use Case Diagram of the Full System



When we talk about the user, we are referring to any person that can access the system features as the customer would do. In other words, someone that can register to the website, search for songs and create a mix album, which together are extensions of the more abstract use case "check for similar albums or artists", make a donation or purchase and download an album or song. This last use case implicitly includes the rating and commenting use case, since the customers that download a song can rate and comment on it. Since both the artist and the administrator, as well as any possible user, can use those customer functionalities, we include all these users and actors in the "user" actor.

However, the artist can do something that nobody else can do, to upload a song or album and also with promotional material. Moreover, both the artists and the administrators can unlist a certain song or album, but no other possible actor can do that, this is the reason for the connection between that use case and only these 2 actors.

Another important note is that the "User" actor can be in several forms, either as an individual or as a company, but since in both case they would have the same participation in the same use cases (considering the use cases we have chosen), we make no distinction about that in the diagram, but it's still worth it to comment it, since they could have some differences outside our diagram.

4.- Use Case Descriptions

In this project, our most important Use Cases are:

- Purchasing an Album
- Commenting on an Album
- Uploading Song/Album
- Making Donations

We believe that these Use Cases represent the most important procedures in the overall usage of SingAlong. That is, building a user-artist feedback and interaction through different commenting procedures, giving musical content and material to the website for users, supporting artists with money through direct purchases without intermediaries and incentivizing a donation culture inside our community to reward artists' efforts.

4.1.- Purchasing an Album

Use case: Purchase album.

Context: A user wants to buy a specific album.

Primary actors: User

Support actors: Artist

Preconditions:

- The user is registered on the platform.
- There is at least one purchasable album available on the platform.
- The user has access to any online payment method.

Successful post-conditions:

- The user gets a physical or digital copy of the album
- SingAlong receives the money and pays the artist the corresponding part.

Unsuccessful post-conditions:

- The user does not get a digital or physical copy of the album.
- The payment is not successfully done and SingAlong don't receive the money

Basic flow:

1. The user logs in the system with his/her account.
2. The user indicates that he/she wants to buy a specific album.
3. The website informs if it is possible to buy the album.
4. If it is possible, the system asks for the payment method.
5. The user selects the payment method.
6. The user confirms his/her purchase.
7. The website sends to the users the purchase confirmation.
8. The users acquire the album.

Extensions:

- 1.a.- The user doesn't have an account.

1.a.1.- Execute "Register on the website".

4.a.- The desired album is not available to purchase.

4.a.1.- This system informs the user and the user goes to step 2 choosing another album.

5.a.- User payment method is not available.

5.a.1 - Go to Step 4 selecting a different payment method.

8.a.- The physical copy is acquired and the CD does not arrive.

8.a.1.- Check with the mailing company if it has been lost.

8.a.1.a.- The physical copy has been lost,

8.a.1.a.1.- The client chooses between receiving a physical copy or having a refund.

8.a.1.b.- Delivery is confirmed, so the user is lying.

8.a.1.b.1.- We block the user of the website.

8.a.1.b.2.- We report to the police.

Implied Stakeholders for Album's Purchasing:

- Maintenance and Support Team of SingAlongs: to make sure the system works properly.
- Human Operators: if the album is purchased physically they need to burn the CD and send it.

4.2.- Comment on album

Use case: Comment on album.

Context: A user wants to comment their opinion or give feedback to a certain album.

Primary actors: Users

Support actors: Artists and Administrator

Preconditions:

- The user must be registered on the platform.
- The user must have purchased or downloaded the album.
- The artist must be providing an album.

Successful post-conditions:

- The user is allowed to comment or review the album.
- Other users are able to view the comment.

Unsuccessful post-conditions:

- The user is not allowed to comment or review the album.
- Other users are not able to view the comment.

Basic flow:

1. The user logs in the system with his/her account.

2. The user must have purchased/downloaded the album previously.
3. If the user fulfills the condition, the system allows the user to comment in the corresponding area.
4. The user comments or reviews the album.
5. The comment/review is uploaded to the website to the corresponding album.
6. Other users are able to view the comment/review that has been made.

Extensions:

- 1.a.- The user doesn't have an account.
 - 1.a.1.- Execute "Register on the website".
- 2.a.- The user hasn't purchased/downloaded the corresponding album.
 - 2.a.1.- Execute "Purchase/Download album".
- 4.a.- The user's comment/review contains sensitive content or abusive language.
 - 4.a.1.-The system blocks the current comment/review and doesn't allow the user to comment anymore (the system logs the user out for some certain time).
 - 4.a.2.- The system gives the user a strike or penalty.
 - 4.a.1.a.- The user reaches the maximum number of strikes.
 - 4.a.1.a.1- The user is automatically blocked from the website permanently.
- 5.a.- The user-server connection malfunctions and connection is lost. Therefore, the comment is not uploaded to the website.
 - 5.a.1.-The system asks again the user to upload the comment/review once connection is reestablished.

Implied Stakeholders for Commenting on Album:

- Maintenance and Support Team. In charge of discussing possible benefits and drawbacks of implementing new features and keeping maintenance of them in the website.
- SingAlong workers of the Software Development department. They will discuss whether it's possible to adapt this framework of rating/commenting in the website, as well as keeping track of validity of the comments.
- SingAlong Community Manager. In charge of discussing the banning system and possible interactions between the users and the artists.

4.3.- Uploading Song/Album

Use case: Uploading Song/Album with promotional material.

Context: An artist wants to upload new musical or promotional material.

Primary actors: Artists

Support actors: Users, Administrator

Preconditions:

- The artist is registered on the platform.

- There is at least one album uploaded already (in case of extra promotional material)
- The artist has different files to upload to the platform.

Successful post-conditions:

- The artist gets to add extra material to a previous uploaded song/album.
- The artist launches a new song/album to the website for the audience.

Unsuccessful post-conditions:

- The artist can't add extra material to a previous uploaded song/album.
- The artist is unable to launch a new song/album to the website for the audience.

Basic flow:

1. The artist logs in the system with his/her account.
2. The artist indicates that he/she wants to upload new material.
3. The website informs whether it is possible to upload new material.
4. The artist chooses the desired new files and uploads them to the website.
5. The website confirms the uploading process to the artist.
6. The website informs users of the new material uploaded from an artist.
7. The users are able to check new material

Extensions:

- 1.a.- The artist doesn't have an account.
 - 1.a.1.- Execute "Register on the website".
- 4.a.- The files chosen from the artists are incompatible with the website.
 - 4.a.1.- The artist modifies the format of the chosen files to upload.
- 5.a.- The system detects some inappropriate material from the artist.
 - 5.a.1 - Depending on the content, it is not allowed to be uploaded so, the artist must change it. Moreover, a strike is given to the artist.
- 6.a.- The artist-server connection malfunctions and connection is lost. Therefore, the material is not uploaded to the website.
 - 6.a.1.-The system asks again the artist to upload the material once connection is reestablished.

Implied Stakeholders for Uploading Song/Album:

- SingAlong Promotional Team: While the album is uploading, the promotional team adds material to promote the album.
- Maintenance and Support Team: Make sure that the app, the website are working properly.
- Specialists for external software: They will discuss whether it's possible to adapt the website for the new album, as well as keeping track of correctness of the new album.
- Music Experts: They will discuss how a song should be uploaded and how an album should be created in musical terms, representing the artists needs and preferences.

4.4.- Making a donation

Use case: Making a donation

Context: A user wants to make a donation to an artist

Primary actors: User

Support actors: User, Artist

Preconditions:

- The user must be registered on the platform.
- The user must have included their payment option information.
- The artist must have provided a link for donations.

Successful post-conditions:

- The user is allowed to donate to an artist.
- The user successfully donates from their credit information.
- The artist gets the donations made.

Unsuccessful post-conditions:

- The user is not allowed to donate to an artist.
- The user can't donate without credit information.
- The artist is unable to get donations from users.

Basic flow:

1. The user logs in the system with his/her account.
2. The user must have included their payment information.
3. If the user fulfills the condition, the system allows the user to donate to a specific artist.
4. The user donates a certain amount of money.
5. The intermediary app for donations, PayPal, confirms the donation.
6. The artist gets the donation made.

Extensions:

1.a.- The artist doesn't have an account.

1.a.1.- Execute "Register on the website".

2.a.- User payment information is not available.

2.a.1.- The user must go to their profile and add the corresponding information.

5.a.- The intermediary app Paypal shows some issues with the payment.

5.a.1 - Depending on the issue, the user must go to the intermediary app and solve the corresponding problem

6.a.- The artist hasn't added their financial information to receive donations.

6.a.1.-The artist should go to his profile and add the corresponding information.

Implied Stakeholders for Making a donation:

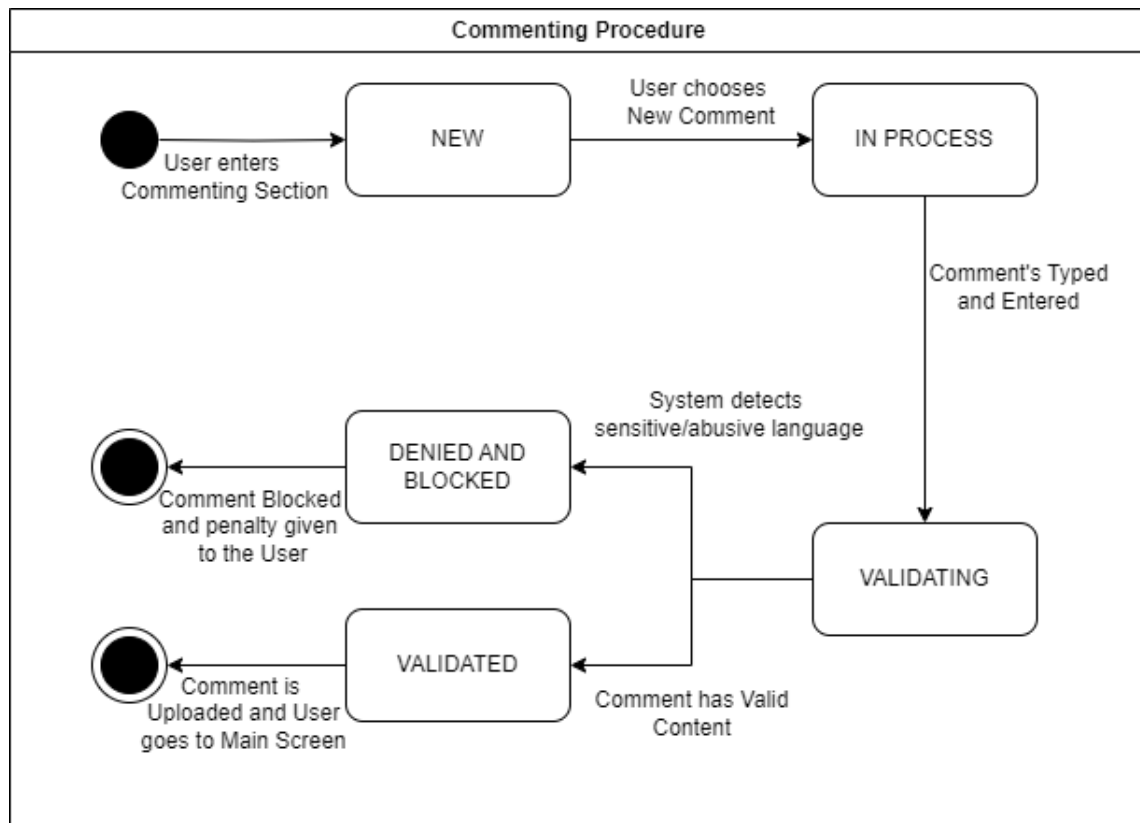
- Maintenance and Support Team: Ensures that the website functions correctly so that payments are made in the correct manner.
- Specialists for external software: They will discuss whether it's possible to adapt the website for the Paypal payment method, and how to include that functionality in an aesthetically pleasing and practical way.
- LawyerTeam. They may be involved in the regulations of the online payment system and the donations, since there may be regulations on how those payments are recollected in the financial data of the company, the artist and the user.

5.- User Stories

A user story is a brief description of a feature or requirement from the perspective of the end user. Attached below, there are some examples of user stories that we have found:

1. **User Story:** As a registered user, I want to listen and have a specific album.
Acceptance Criteria:
 - a. To download the album I have to purchase it, so when I click “purchase album” I am automatically redirected to PayPal where I complete the purchase.
 - b. The album I want is free, so I can download it for free just by selecting the download option.
 - c. The album has not been published yet so I make a reservation to have it just at the moment the album is going to be published.
2. **User story:** As a common user, I want to create an album with my favorite songs.
Acceptance Criteria:
 - a. When I select a song, I select the option to create a new album to add to it.
 - b. On the new album, I have the option to change the name of the album and add more songs.
 - c. Once I have created the new album, I have the option to make the new album
3. **User story:** As a user, I want to burn an album from MP3 to CD.
Acceptance Criteria:
 - a. When I choose an album, I select the option that I want the album to be, in this case I choose the CD option.
 - b. The option to convert is free and you can convert as many albums you want.
 - c. The album has been physically delivered by a delivery service, so that the user will receive the album in a few days in the format that he/she wanted.
4. **User story:** As a user, I want to make a donation to a specific artist.
Acceptance criteria:
 - a. I choose an artist who I want to make a donation to, because I like his/her music.
 - b. I select PayPal as the payment method, as it is the intermediary integrated by the system... Furthermore, I choose the method that I will make the donation, only for one day or every month or every week.
 - c. The donation has been made to the artist.

6.- State Diagram



From the previous Diagram we have defined the State of Commenting on an Album/Song. To do so, we have at first two different spaces, the table where there are all procedures related to commenting, and outside the previous table where there are the procedures not related to commenting. These second ones are more general procedures that are common for many different procedures in the website while the first ones are exclusively of the Commenting procedure.

Firstly, the outside actions start with the user, who has to create an account in order to enter SignAlong and have the account validated, as it has been said, many other users not interested in commenting may need an account for several other purposes.

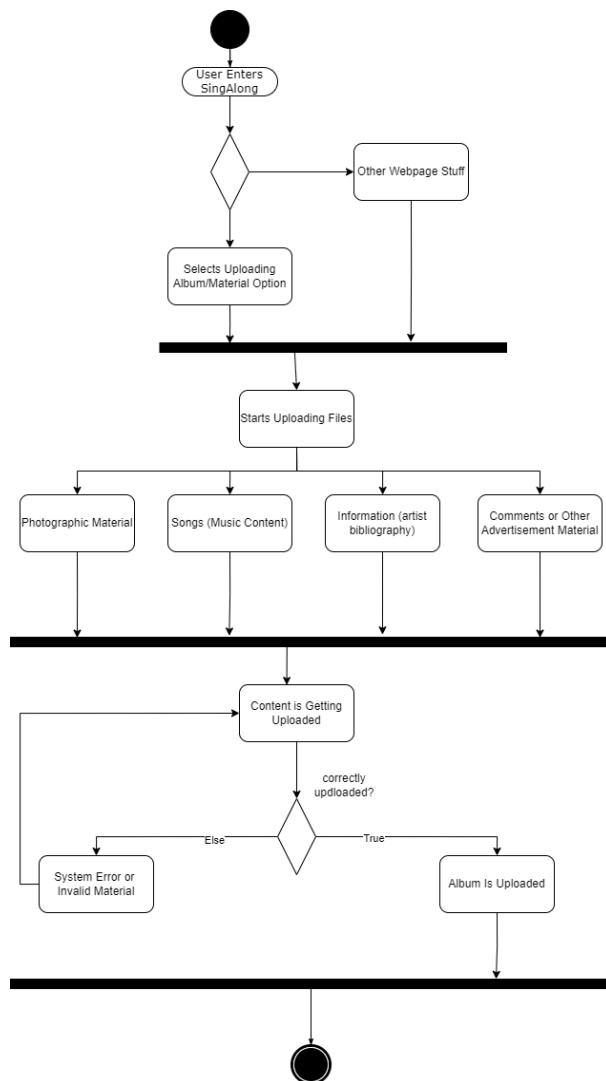
Once the user enters, it is possible to browse through the website for different albums or songs, or also to sign out, again activities that can be done by other users with different motivations. In case the user selects an album or song, the user is allowed to hit the "Comment" button.

Once this option is marked, we enter the box of the Commenting procedure, where at first, the system verifies whether the user has already purchased the album or not, and different options are followed depending on the condition. In case the condition is fulfilled, the user enters the Comments Section where, if the connection is working, the user will be able to type the comment.

Once the comment is uploaded, the system validates it, in case everything is correct, the user returns to the main page, whereas if the comment is denied, it will be automatically blocked and a penalty will be given to the user. If the user gets more penalties than the authorized maximum, it will be blocked from the page permanently, otherwise the user will go again to the main page of SingAlong.

7.- Activity Diagrams

7.1.- Publishing album



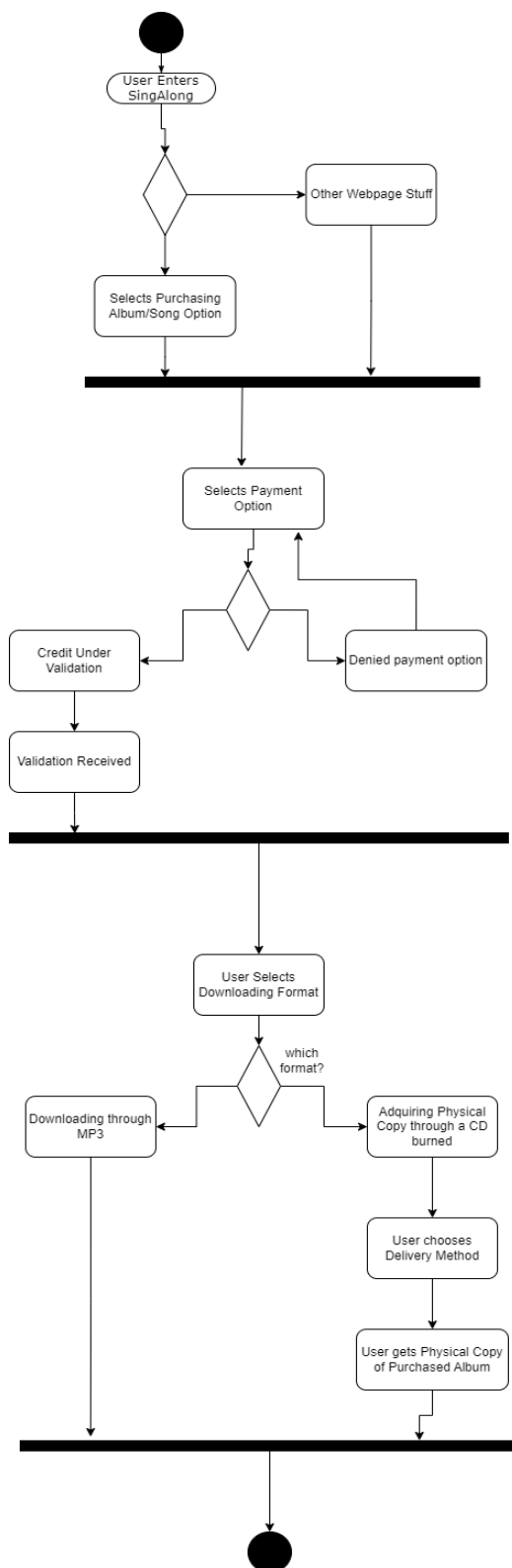
In this diagram the user enters in the Sing Along webpage, and he/she can do two things.

On one hand, go to another webpage or on the other hand select the option of uploading an album/material. If he/she chooses the second option he/she starts uploading files: photographic material, songs, artist information and other advertisements materials.

Once the content is selected and it is getting uploaded, then the system verifies if the upload was successfully done. If there was a error or the material uploaded does not fill the requirements, then it sends a error message back to the user to provide him/her the feedback and if it is due to a invalid format it requests to the user to do the process again, otherwise if it is a network or technical error it restarts the uploading.

When the material is uploaded, it is notified to the user and the activity ends.

7.2.- Purchase an album



In this diagram we represent the process associated with a user purchasing an album. In the first part, the user needs to log in the website, as well as selecting the option needed for purchasing the album.

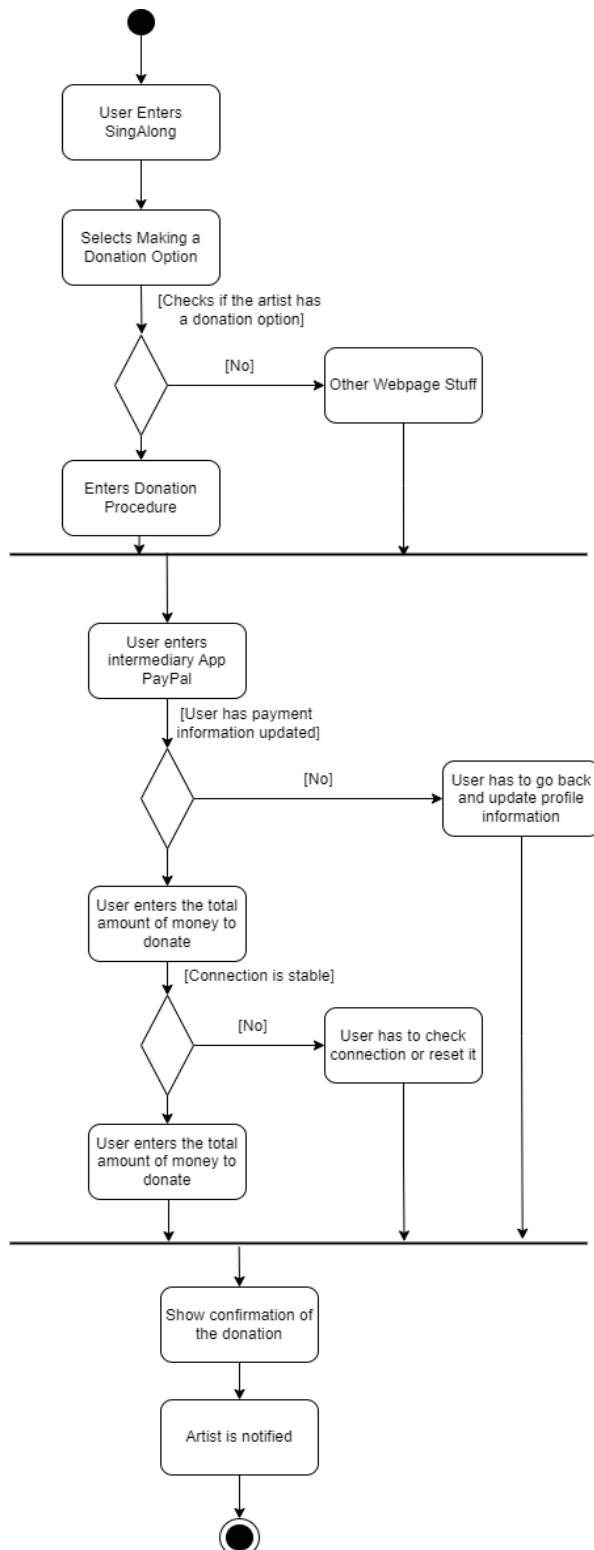
Once the purchasing process is initiated, the user must select the payment method, which must be validated in order to continue the payment process. If the method is invalid or does not work properly, the user is asked for an alternative payment method.

When the payment method is already validated, and the transaction is confirmed, the system allows the user to choose the download format between MP3 or a physical copy through a burned CD.

In the first case, the download just starts without any more inconvenience, ending with this activity. However, in case it is chosen the burned CD, the user will be requested to introduce the delivery option and the corresponding information.

Once the delivery method is selected and confirmed, after a couple of days (depending on the delivery method and user location), the user will receive its physical copy in a CD and finish with the Purchase an album activity.

7.3.- Make a donation



In this diagram we represent the process for making a donation. At first, the user must login in SingAlong and select the desired artist to make the donation.

Donations will be made only if the artist has previously added a link to make donations in their profile. If that is so, the user is allowed to continue with the procedure.

Just after selecting the donation procedure, the website will redirect the user to an intermediary app PayPal where the payment process will take place.

After checking that the user has stable connection to SingAlong servers, as well as having complete payment information in their profile, the user has to introduce the desired amount of money to donate and complete the process.

When the donation is already done, a confirmation will be shown to the user and the chosen artist will be notified about the action.

8.- Functionalities

This section aims to show the most important functionalities obtained from the functional requirements stated by stakeholders opinion and needs.

- **User Verification:** To prevent fraudulent behaviors, such as the creation of multi-accounts in order to manipulate the voting system, the application should need extra information during user registration, such as phone numbers or email addresses. This would also enable the system to notify users when new content is available, that can be an incentive to users to share personal data at the same time as we ensure the privacy of the user.
- **Donation Promotion:** It should be possible to present the donations in an accessible way. More information on the impact of donations on artists should be supplied to motivate donations. This feature wants to promote a supportive atmosphere for musicians within the community of the platform.
- **Quality control and track detection:** Since the system is open, the app should include a way to distinguish high quality from low quality music. This could include a reward for unique performance for new artists or voting elements for experienced musicians. This tool should facilitate the discovery of high-quality music and successful artists, increasing user engagement and retention.
- **Dynamic Artist Performance Lists:** On each user's home page, the system should present three separate lists of the top 10 performers. These lists should show the top 10 performers overall, over the previous six months, and over the last 15 days. A musician may appear on multiple lists based on their performance over different time periods. The performance is computed as is explained in a previous point. These lists should be customizable, with the ability to change the number of artists included by some kind of administrator.
- **Song Allocation to Albums:** The system should prevent artists from including the same song across multiple albums. This rule should be set during the song upload stage to ensure that each song belongs to only one album. This is in order to help the customers to avoid getting confused during the process of purchasing.
- **Customized Album Creation:** Users should be allowed to make customized albums by choosing music from various artists. The entire cost of such an album should be estimated by adding the individual expenses of the songs chosen. This feature should improve user satisfaction and engagement.
- **Physical Device Management:** The system should provide a separate interface for a human operator to input music from physical devices into the system, rather than through a web browser. This operator should also be responsible for burning and

sending CDs to customers who purchase them. The number of operator accounts created should be proportional to the workload and these accounts should be easily created and deleted as required.

- **Manage promotional content:** When promotional material is uploaded, the system should immediately link it to the artist's songs. There should also be a review system in place to guarantee that the promotional content fits the platform's criteria. By making it easier to get promotional material, this capability should improve the overall user experience.

9.- Non Functional Requirements

Product: Without being functional, they restrict behavior.

- Usability:
 - Maximum learning time: Ensure that the user can navigate and understand the basic functionality of the application within 10 minutes of initial usage.
 - There must be a search toolbar that allows users to search by song, album or artist name.
 - There must be a filter toolbar that allows users to filter songs by music style, language or publication date.
 - There must be a main menu which contains the recent albums displayed by the user, as well as the searching or filtering tools, and an option to discover new music.
 - The application should incorporate accessibility features to ensure that people with disabilities can access the system. For instance, text-to-speech options, high-contrast modes, keyboard navigation and other accessibility functions.
 - The application should incorporate a FAQ section, tutorials and user guides to provide help and support. There must also be several contact options to facilitate the users to reach closer customer support, such as email, or live chat.
 - There must be a link for making a donation to an artist in his/her corresponding case. This must happen for all the possible artists at any moment.
- Efficiency:
 - The music should be charged and downloaded easily and fast, preventing the user from having to wait. After a click on a corresponding song, the music should start playing at most 1 second after.
 - The application must respond to user events, like clicks or searches, within 1 second to maintain a smooth experience of the user.
 - The application should be able to update a page with a refresh page of less than a second to provide quick and seamless updates.
 - In the case of physical delivery, the fastest delivery possible should be guaranteed, and it should not last longer than 2 weeks.
 - An extra shipping option should be offered, giving a faster delivery with a higher payment, since it'd be more expensive to contract a priority delivery in the corresponding country.
 - The system should be able to support a minimum of 100 transactions per second for purchasing music, commenting, and other user interactions. Note: This number could be adapted to the actual budget and number of users of the application.
 - The application size should be limited to 100 MB [1] on the hard drive and it must consume at most 500 MB of memory during operation. [2]

- Conduct continuous testing to identify and resolve any memory leaks, ensuring the application remains stable and efficient over extended periods of usage.
- When the user searches for a song, artist or album, the first 10 options must appear in less than a second. More options should be also available after a few seconds in the worst case scenario.
- A maximum size of 10MB is accepted for any uploaded song. The application does not include podcasts or other type of sound recordings, for now, so any songs uploaded by the artists may be equal or less than 10MB. [3]
- Robustness:
 - The company should have backup servers ready to act in case of failure, so in less than a minute of a shutdown the web should be fully operative again.
 - Error Tolerance: The application should gracefully handle common user errors, such as invalid inputs, and provide clear error messages and suggestions for correction.
 - Recovery Time: After unexpected shutdowns or system failures, aim for a maximum recovery time of 10 seconds to restore the application to its previous state and minimize data loss.
 - Design the application to gracefully degrade functionality in case of system failures or insufficient resources, allowing users to continue using the available features without disruption.
 - Security Measures: Implement security measures, such as encryption of sensitive data, secure authentication, and authorization mechanisms, to protect user information and prevent unauthorized access.
- Portability:
 - The web should be accessible from all types of electronic devices (computers, smartphones, TVs, smartwatches) so the users can bring their music with them.
 - Design the system core functionality of the application to be portable across different operating systems, such as Windows, macOS and Linux, as well as different mobile operating systems, to maximize user accessibility. It implies by itself that the application must work in a web-browser.
 - Integration Portability: Ensure that the application can be seamlessly integrated with external systems, such as payment gateways and artist promotion platforms, to support future expansions and collaborations.
 - Browser Compatibility: Design the application to be compatible with major web browsers (e.g. Chrome, Firefox, Safari) to allow users to access and interact with it seamlessly.
- Scalability:
 - Design the application to be easily scalable, allowing it to accommodate a growing user base and handle increased data volume and traffic without significant performance degradation.

- Language Support: Provide support for multiple languages and internationalization, allowing users to interact with the application in their preferred language.

Organizational: Restrictions on development due to client policies or procedures. Some examples are:

- Deliverables: Specific types of deliverables and deadlines
 - There should be deadlines for delivering the updates of the web to ensure timely enhancements to the system. Since the simulation of this software project is bounded by the seminar sessions, the deadline for the deliverables must be in 2 weeks, prior to the next session.
 - Generate periodic reports to demonstrate compliance with deliverable requirements and progress towards meeting project milestones.
- Implementation: Tools and technologies may be restricted
 - The low-level programming of the project must use c++ language. Other options may be explored, but given the provided context this would be the option that fits the best our requirements.
- Standards: Many companies have quality standards that have to be followed.
 - All the songs can be with different types of qualities. It can be from low quality to high quality. The best quality supported is gonna be around .wav 16 bits [4] and 44kHz. [5]
 - Regarding the previous requirement, if the song quality is too low, it would be revised, since there must be a minimum of quality that assures the user experience, and it would not depend on a specific range of quality but on the reflect on the song reproduction.
 - No matter the uploaded quality of a song, it must have several options for the users to download it. Users can download it either in mp3 or ogg format, and with size of 192, 128 or 96 kbps.

External: Restrictions that originate outside the product and its development (may coincide with domain requirements). Some examples are:

- Interoperability (regulatory): being able to interact with an external interface
 - SingAlong should be able to work together with social media platforms, as the users have to be able to show and share the music they are listening to on our platform.
 - SingAlong must be compatible with the PayPal paying method. It must have a clear compatibility with the donations and payments options for the user.
- Ethics: ethical restrictions that apply
 - The system should take a lot of care keeping secure and inaccessible user personal information.

- The system must not take any commission from the donations, since they are intended to be a help for the artists and come from a free willingness of the users.
- Social: changes that are not acceptable by people using or implementing the system
 - The system should consider social factors such as content filtering options or diverse representation in playlists and recommendations.
 - The system may discard and delete any song with offensive content to any social collective or belief, penalizing the artists that upload songs with discriminative or imposing beliefs, and the comments of the users doing the same.
- Legislative:
 - SingAlong should take into account the copyright policy of each country where there is a user, also having license regulations for music distribution.
 - As in ethics, data privacy policy is fundamental that is treated as the law of each country establishes, the system must ensure the privacy and safety of the users regarding all the justice boundaries.