Harmonia Music

Software Requirements Specification

CSCE 247: Software Engineering

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Section 1: Introduction

The purpose of this project is to create a user-friendly music library app that provides a seamless yet simplistic experience for musicians of skill levels. This platform is designed to be a hub for storing, organizing, and accessing music from various genres, featuring tools that engage both casual listeners and those that are passionate about learning.

This application will allow users to save audio files, manage playlists and explore metadata such as artists profiles, information on albums, and various genre categories. In addition, there will also be tools provided to help users learn more about the fundamentals of music, including tutorials, beginner-friendly suggestions, and interactive options for exploring new artists and genres.

The main goal is to build a reliable, easy to navigate platform that provides the user with the tools necessary to manage a scalable music library that is user-friendly and easy to navigate. The app is designed to:

- Help user organize and access music in a simple and effective way
- Integrate useful tools for discovering and learning, particularly for beginners
- Provide useful insights to users such as recommendations and other personalized features

Most music apps focus mainly on streaming and managing playlist, overlooking the importance of organization and education. This application fills the gaps by providing:

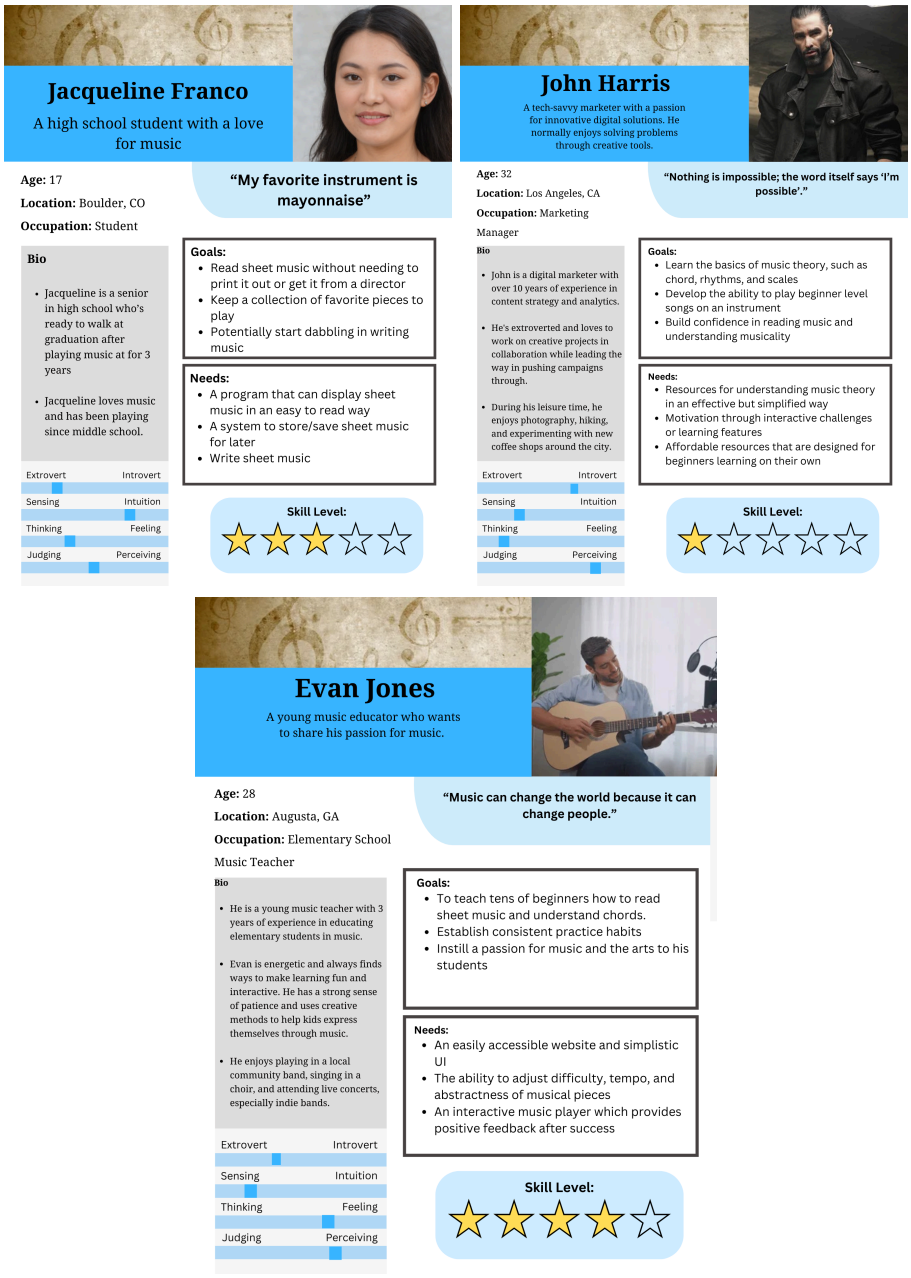
- A platform for user to effectively manage and organize both offline and personal music libraries and playlists
- Educational features designed for beginners, helping to expand user's understanding and appreciation for music
- Offer a unique, yet affordable alternative for those looking for a simple way to manage music libraries, with both offline access options and featured tools

By using this platform, users will be able to gain both a unique and engaging experience while exploring the music and genres they love.

Section 2: Stakeholders

- Pianists
    - Beginner Players
    - Intermediate Players
    - Advanced Players
- Music Teachers

- Orchestra/Band Students
- Songwriters



Section 3: Constraints

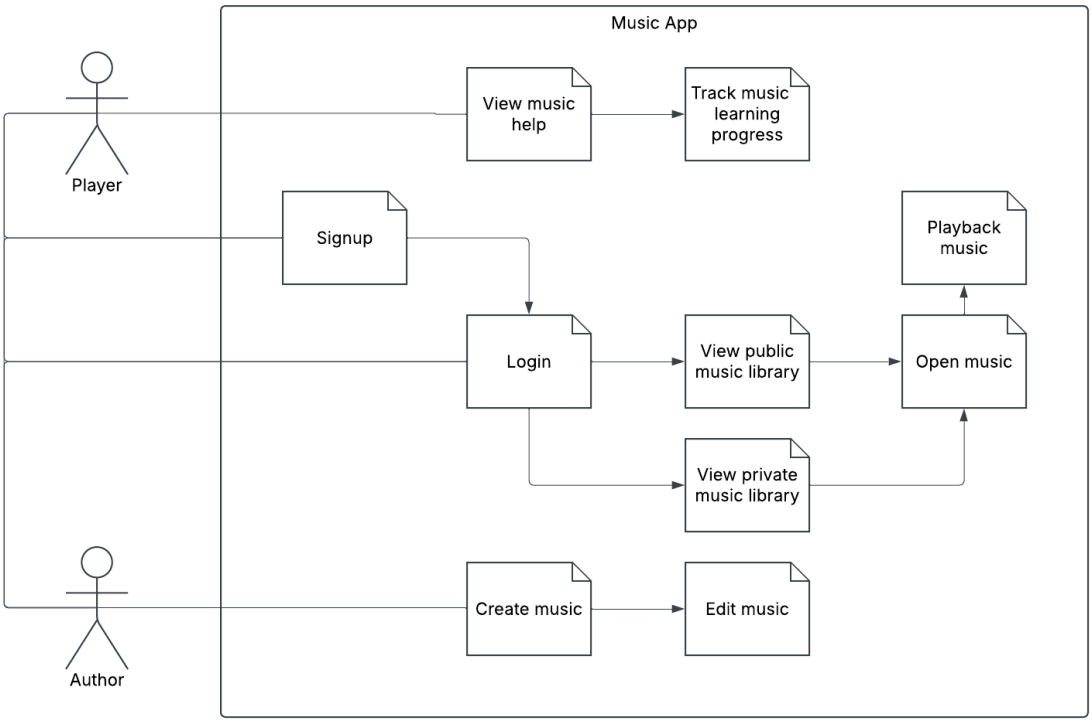
Our biggest constraint in this project is time. We have 1 semester to complete this, so we must keep our functionality from being too broad. Because of this, we will use as many custom systems as possible, to avoid learning new file formats or data conversion (ex: MIDI). This will also require us to intelligently prioritize certain features over other ones.

Another constraint we have is a lack of budget. This isn't a big deal, but it's an area that could have solved some issues caused by time constraints. We are also only a team of 4 people, working primarily in VSCode, constraining the level and variety of talent that will be able to make its way into the final product.

Section 4: Overall Description

This app is a useful tool for pianists of all ranges of skill. This app will contain an archive of piano sheet music, a music editor where users can create their own music, and a music player that displays the sheet music as it plays. The user will be able to search through the archive of music, and be able to publish their own content. Users will be able to set the music they upload to be either private or public, with the latter being able to be searched and listened to by other users. Public music will have a rating system, where other users can like or dislike others' uploaded songs.

Section 5: Business Use Cases



Section 6: Functional Requirements

- Spreadsheet: https://docs.google.com/spreadsheets/d/1wWAeMCIJIiQ49_egsZR0WZ9hbdkwP0W8nZQD8kUcarg/edit?usp=sharing

- Sheet: Functional

Section 7: Non-Functional Requirements

- Spreadsheet: https://docs.google.com/spreadsheets/d/1wWAeMCIJIiQ49_egsZR0WZ9hbdkwP0W8nZQD8kUcarg/edit?usp=sharing
- Sheet: Non-Functional

Section 8: Definitions and Acronyms

- Genre
  - A categorization of music that describes the feeling of the music, as well as musical techniques used to create it
- Metadata
  - A type of data that describes an object, but isn't core to the functionality of said object
- MIDI (Musical Instrument Digital Interface)
  - A system to store/transfer musical data, either in a data stream, or in a file

Section 9: Competitive Analysis

Musescore

Musescore is the leading sheet music program on the market currently. It has a broad variety of musical instruments, writing styles (traditional and tablature), and musical features. It has a library function that allows you to save as many scores as you want. Musescore also has a professional audio library so you can hear what your music will sound like when played. The reading side is geared towards any musician, while the writing side can be a bit complicated for beginners.

Songsterr

Songsterr is a program primarily for musicians without sheet music knowledge. The music on the website is primarily written in tablature and is easy to play along with. That being said, the audio you play along with consists of low quality MIDI instruments, making it not a great choice for composing. This program is focused primarily on allowing people to learn their favorite songs on modern instruments such as guitar and drums.

Flat.io

Flat.io is similar to Musescore, but a little more watered down. The writing side of the software is intuitive, but lacks features a professional composer may want. Its library feature is limited,

unless you have the paid version. The audio isn't professional grade, and thus doesn't give the best idea of what the piece will sound like when played, but still gives a decent frame of reference. The exploration function of this program is much more limited than the other 2, and acts more as a platform for people learning to write sheet music.

Comparison Table

	Reading	Writing	Library	Style	Audio	Cost
Musescore	5/5	4/5	5/5	Mixed	5/5	Free + Add-ons
Songsterr	4/5	3/5	3/5	Tabs	3/5	Free - $10/month
Flat.io	4/5	3/5	2/5	Traditional	4/5	Free - $10/month

Analysis

From this competitive analysis, there seem to be 3 major draws of software of this type. The first draw is people looking for compositions. Whether they're original or covers, these programs, especially Musescore, act as a place for people to share and save music. The second draw of these programs is learning music, which Songsterr seems to tackle better than the other 2, as it's very beginner friendly. A program aiming to let people learn music focuses primarily on how readable its music is, specifically for people who don't understand sheet music. The third draw is writing music. This is a much different draw than the other 2, as creating a music writing program is much more complex, and requires much more UX thought. Flat.io is a good program for beginner writers, but is overshadowed by Musescore's more in depth writing tools.

Based on this analysis, it seems to be in our best interest to prioritize the reading aspect of sheet music. Having an easy way to switch between traditional sheet music and tablature could set us apart from competition. After this, it also would give us a leg up to focus on discovery/library over writing. Writing is a more niche and complicated aspect of these programs, and creating a worthy competitor to any music writing software is simply not possible with our constraints. The discovery and saving of music is a much more important aspect.

Other features, such as audio, should be at the bottom of our list. Audio is a very useful feature for people learning music, but only needs to be high quality for those writing. As stated above, reading seems to be a better area to focus on, and as such we shouldn't sink time and resources into audio. Overall, there seems to be a gap in the market for a program that focuses primarily on having a vast public library of music, with the ability to learn that music, no matter your skill level, and save your favorite pieces. With this route, our closest competitor is

Songsterr, where we have the leg up on having features for a variety of musicians, as opposed to just musicians who are learning music and/or don't know sheet music.

Section 10: References

- Personas made using https://www.canva.com/
- Use case diagram created using https://www.lucidchart.com/
- Competitors:
    - https://musescore.org/
    - https://www.songsterr.com/
    - https://flat.io/

Section 11: Appendix

Section 5: Use Cases

A user can sign up, login, view private and public libraries, open music, and playback music. A user who's writing music can create music and edit that created music. A user who's playing music can view music help and track lesson progress.