

THE IDEAL MUSIC APP

SOFTWARE REQUIREMENTS SPECIFICATION

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1. Introduction

Purpose/Description:

We strive to make a simplistic music learning app that's targeted for beginners/people with no music experience.

Goal:

The goal is to understand our users and make the ideal learning environment that allows music to be learned efficiently.

Business Problem Being Solved:

The problem we strive to solve is music being an abstract concept to learn and along with the feeling of being stranded when embarking. We are solving this problem by introducing the core concepts of music then slowly advancing forward as comfortability, confidence, and trust is built in our users.

2. Stakeholders

- **Beginners In Music/People with little to no experience**
- Age Range (13 - 45)
- Middle School Students, High School Students, College Students

- **Educational Music Institutions**
- Music Equipment and Instrument Brands
- Technology Companies Specializing in Music

- **Musicians**
- Music Artist
- Producers



Name: Maria Cortez
Age: 20 Years Old
Residence: Chicago, Illinois
Highest Level of Education: Bachelor's in Music Theory
Occupation: Piano Teacher & Composer

Biography/Background:

Maria Cortez is a classically trained musician and aspiring composer with a passion for piano and experimental electronic music. Based in Chicago, she divides her time between teaching piano to young students and working on her own avant-garde compositions. She is eager to deepen her craft and seeks tools that allow her to experiment with new musical styles while refining her skills.

Level of Musicality: Advanced (focused on piano and composition).

Ability to Operate Software: Proficient with notation software, DAWs (like Ableton Live).

Personality Traits: High in creativity and introversion; logical and strategic thinker.

Goals:

- Master advanced piano techniques.
- Collaborate with other musicians and composers.
- Access rare sheet music and experimental works.
- Share her compositions globally to build her reputation.

Frustrations:

- Difficulty finding resources for niche experimental music.
- Limited feedback on her piano performances and compositions.
- Lack of connection to a network of like-minded musicians.

Brands and Influencers:

Artists: Ludovico Einaudi, Philip Glass, Max Richter.
Brands: Steinway & Sons, Moog Synthesizers, Sheet Music Direct.



Name: Jorge Martinez
Age: 30
Residence: Houston, Texas
Highest Level of Education: Welding School
Degree:
Occupation: Welder

Biography/Background:

Jorge Martinez is a hardworking welder who finds joy in learning the guitar during his free time. He's inspired by Latin and rock music and wants to improve his playing to perform at family gatherings. Jorge balances his busy work life with his love for music, hoping to bring more creativity into his daily routine.

Level of Musicality: Beginner (focused on guitar).

Ability to Operate Software: Comfortable with basic apps and tools.

Personality Traits: Practical and hands-on; motivated by clear progress and achievement.

Goals:

- Learn guitar fundamentals and improve rhythm.
- Access tutorials for Latin and rock guitar techniques.
- Connect with local musicians to jam and learn together.

Frustrations:

Limited time to practice due to work.
Lack of hands-free options while using guitar tutorials.
Struggles with maintaining motivation without clear progress tracking.

Brands and Influencers:

Artists: Santana, Johnny Cash, The Eagles.
Brands: Fender, Yamaha, Ultimate Guitar.



Name: Ashley Johnson
Age: 37
Residence: Sacramento, California
Highest Level of Education: Journalism School
Degree:
Occupation: Journalist

Biography/Background:

Ashley Johnson is a dedicated journalist with a lifelong dream of learning the violin. She wants to incorporate music into her fast-paced lifestyle as a way to relax and grow creatively. Ashley is drawn to the violin's rich history and its cultural significance across the globe, and she's eager to integrate her learning with her writing.

Level of Musicality: Beginner (focused on violin).

Ability to Operate Software: Proficient; frequently uses apps for research and organization.

Personality Traits: Curious and intellectual; values structure and cultural exploration.

Goals:

- Learn beginner-to-intermediate violin techniques.
- Explore the cultural history of the violin through lessons and documentaries.
- Connect with local teachers or small ensembles for support.

Frustrations:

- Struggles to find time for practice due to her career.
- Difficulty accessing reliable resources tailored to adult beginners.
- Challenges with technique improvement without real-time feedback.

Brands and Influencers:

Artists: Hilary Hahn, Joshua Bell, Lindsey Stirling.

Brands: Yamaha Violins, Fiddlerman, The Strad.

3. Constraints

Schedule

- Because this is a semester-long project, we will have ~3 months to complete it.
- Weekly progress deadlines.

Budget

- The budget for this project will be \$0.

Technical

- This project will be developed in Java.
- The project will have to be compatible with mobile, PC, and laptop devices.
- The project will be completed across 4 different group member's workspaces.

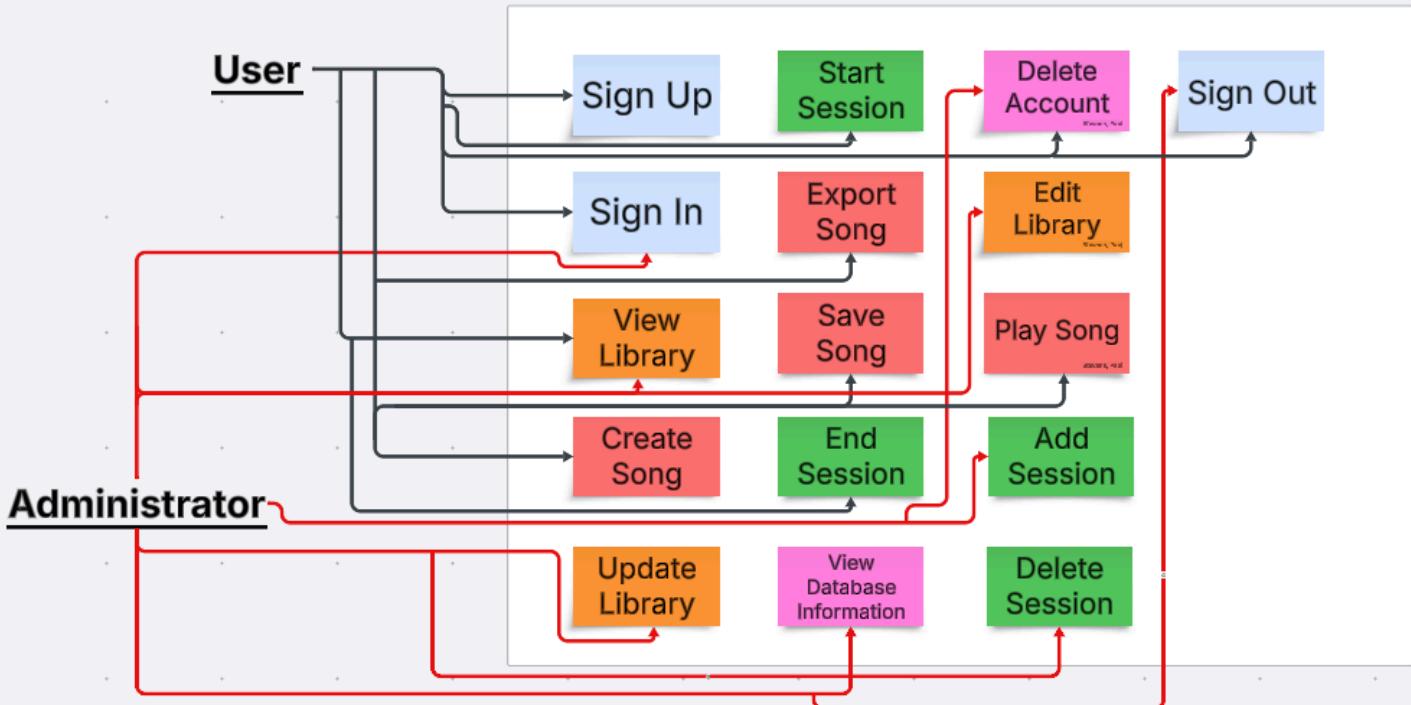
Partner Apps

- The project will need to use content from other apps (such as songs and sheet music files)
- The project will need to be compatible with other apps

4. Overall Description

The app must be available to users across all of the different platforms, such as Mobile, PC, and Laptop. The app will include sheet music for select instruments to allow for the users to learn and advance their skills in reading music and playing instruments. This will be featured by including files for the different songs. The app will also include social media implementation to allow us to include from across the internet and also for user sharing as well.

5. Business Use Cases



Use Cases Description

User

The user will create an account, then will have the ability to sign in, sign out or delete their account.

A user has the ability to view the song library and then start a session and end a session with a song chosen.

The user has the ability to create a song, save the song, play the song, and export a song.

Admin

The Admin will be able to sign in and sign out.

The Admin will be able to view the library, edit the library, such as deleting a song or adding a song, and updating the library after changes have been made.

An Admin account will have access to user information such as login information and session tracking.

An Admin account has the ability to delete accounts. An Admin account has the ability to add sessions or delete sessions.

6. Functional Requirements

[Google Doc Link: Requirements Spreadsheet](#)

1 Name	Requirement	Priority Rationale
1 User Account Creation	The user shall create an account with the following criteria: <ul style="list-style-type: none">* Username<ul style="list-style-type: none">- Must be at least 4 characters long* Password<ul style="list-style-type: none">- Must contain at least one special character- Must contain at least one uppercase letter- Must be at least 7 characters long	<ul style="list-style-type: none">1 Allows the user to access the platform.1 Users need to be distinguishable from each other.2 Usernames should be somewhat restricted in length for further identification.1 A password is needed for protecting the user's account.2 Allows for a more unique, more secure password.2 Passwords that vary in case are more secure compared to all lowercase passwords.1 The longer a password is, the more secure it is.
2 User Account Login	The user shall log into their account entering the following fields: <ul style="list-style-type: none">* Username* Password	<ul style="list-style-type: none">1 Allows the user to access their account11
3 Administrator Account	An admin shall log into their account entering the following fields: <ul style="list-style-type: none">* Username* Password	
4 Library of Songs	The system shall have a preloaded database of songs.	<ul style="list-style-type: none">1 Preloaded content must be accessible for all users that may not want to engage with user generated content.
5 Play Music	The system shall allow the user to play a selected track from the library.	<ul style="list-style-type: none">1 To listen to music from the library.
6 Pause Music	The system shall allow the user to pause music playback	<ul style="list-style-type: none">1 To stop music temporarily and resume later.
7 Volume Control	The system shall allow the user to adjust the playback volume.	<ul style="list-style-type: none">1 To control sound levels.
8 Music Progress Bar	The system shall display a progress bar during music playback.	<ul style="list-style-type: none">2 To show the progress of a song.
9 Search Feature	The user shall search for a song with the following criteria: <ul style="list-style-type: none">* Title* Artist* Genre	<ul style="list-style-type: none">1 User must be able to access content on the platform.1 Songs must have a distinguishable title.1 Songs must be credited to an author.2 Users can narrow their search to a certain genre of songs.
10 Creating a Song	The user shall be able to compose a song.	<ul style="list-style-type: none">1 Users must be able to create their own songs for publishing.
11 Record Music	The system shall allow the user to record their music.	<ul style="list-style-type: none">1 To capture the user's interactions with instruments
12 Loop Music	The system shall allow the user to loop a section of the music.	<ul style="list-style-type: none">2 To repeat sections for editing or refinement.
13 Track Volume Control	The system shall allow the user to adjust the volume of individual tracks.	<ul style="list-style-type: none">1 To balance different sound elements in a composition.
14 Music Timeline	The system shall provide a visual music timeline for composition.	<ul style="list-style-type: none">1 To help users arrange and edit their music visually.
15 Tab Display	The system shall display the song in tab form, which consists of: <ul style="list-style-type: none">* 6 lines for each string of a guitar (E, A, D, G, B, E from bottom to top)* Vertical lines dividing measures* A time signature* A lyrical line* A list of chords	<ul style="list-style-type: none">1 Tabs are simpler to understand and create compared to sheet music.1232
16 Add Note	The user shall add a note to the desired line with the following options: <ul style="list-style-type: none">* Adjustable amount of beats (whole, half, quarter, eighth)* Location of note on the fret board	<ul style="list-style-type: none">122
17 Add Chord	The user shall add a preset chord to the desired location with the following options: <ul style="list-style-type: none">* Selection from A, B, C, D, E, F, and G bar chords with minor variants	<ul style="list-style-type: none">22
18 Add Measure	The user shall add a measure to their song.	<ul style="list-style-type: none">2
19 Add Chord to List	The user shall add a chord found in this song to a list.	<ul style="list-style-type: none">1
20 Add Lyrics	The user shall add lyrics to their song.	<ul style="list-style-type: none">2
21 Add Time Signature	The user shall add a time signature to their song.	<ul style="list-style-type: none">2
22 Save Composition	The system shall allow the user to save their music compositions.	<ul style="list-style-type: none">1 To keep their work for future editing or playback.
23 Manual Save	The system shall allow the user to manually save their composition.	<ul style="list-style-type: none">1 To give the user control over saving their work.
24 Export Music	The system shall allow the user to export compositions with the following formats: <ul style="list-style-type: none">* MP3* WAV	<ul style="list-style-type: none">1 To enable sharing and playback of compositions.1 To provide a standard audio format.1 To provide a higher quality audio format.2 To provide control over the quality of exported music.
25 Export Settings	The system shall allow the user to adjust export settings with the following standards: <ul style="list-style-type: none">Sample RateBit Rate	

7. Non-Functional Requirements

Google Doc Link:

 Benz Boyz Software Non-Functional Requirements Spreadsheet

1 Name	Requirement	Priority
Look and Feel Requirement	The system shall include an easily understandable interface	1
Usability Requirement	The system shall be used by users with a wide range of capabilities	3
Performance Requirement	The system shall run on any device that is connected to internet	1
Maintainability and Support Requirement	The system shall run on Mac OS, Windows, Linux	1
Security Requirements	The system shall store user information securely	1
Cultural Requirement	The system shall support multiple languages	3
Legal Requirement	The system shall comply with local and state law	2
Accessibility Requirement	The system shall be accessible to users with disabilities	1
Backup and Recovery Requirement	The system shall have a data recovery mechanism in place	2
Load Handling Requirement	The system shall be able to handle a high number of concurrent users	2

8. Definitions/Acronyms

Note: A sound that represents a specific pitch and duration.

Pitch: A sound being perceived as high or low, measured in hertz.

Key: The scale of notes that form the tone of a piece of music

Hertz: A unit of measurement for the number of vibrations per second in music.

Measure/Bar: A segment of time in a piece of music defined by a given number of beats.

Beat: the repeating pulse in music which gives the music its speed/rhythm.

Song: A song shall consist of one or more measures.

Tab: a music notation that shows which string to be plucked on instruments.

Chord: A group of notes that are played simultaneously.

Scale: A series of notes arranged in ascending or descending order.

Harmony: The combination of different musical notes played or sung simultaneously to support the melody.

Chorus: The main part of a song, often repeated after each verse and usually containing the song's most memorable lines.

Tempo: The speed at which a song is played, often measured in beats per minute.

Track: A single song or a part of a song in a music production.

Mixing: The process of combining different audio track

Arrangement: The way the different parts of a song are ordered and structured.

Loop: A section of music that repeats continuously

Bridge: A contrasting section of a song that provides a break from the verses and chorus before returning to the main part.

9. Competitive Analysis

<u>Competitors</u>	<u>App Attributes</u>
Duolingo	<p>Strengths: Beginner friendly. Game-like interactions, colorful and expressive animations. Consistency based motivation. Virtual piano for practicing.</p> <p>Weaknesses: Limitations to a single instrument. Exercises can be repetitive at times. Limited learning customization.</p> <p>Audience: Casual Learners, Beginner, People with no experience or instruments on hand</p>
GuitarTuna	<p>Strengths: Guitar Based Learning: Provides a deep dive into guitar techniques and playing styles. Open for different levels of experience (Beginner, Intermediate, Advanced). Offers access to tools like metronomes, chord libraries, and tuning. Includes minigames to learn chords, such as memorization by ear and chord mapping. Allows connectivity with Spotify.</p> <p>Weaknesses: Guitar Based Learning: Learning is limited to a single instrument, despite offering tuning options for instruments like violins. Convenient features like Smart Scroll are locked behind a premium subscription.</p> <p>Audience: Casual Learners, Dedicated Learners</p>
UkuTabs	<p>Strengths: Acts as a hub for almost all things ukulele. Includes an automatic and manual tuner, a chord builder, a plethora of guides, and an archive of chord diagrams, scales, and songs. Each song contains customizable and printable tabs. Below each song is a comment section where users can interact and provide advice.</p>

Weakness: The site does not contain any built-in song player, so users have to use some sort of external source to listen to the song.

Audience: Casual Learners, People with no experience or are interested in learning about the ukulele

Summary

Based on the competitive analysis above, our product will provide similar opportunities as Duolingo and GuitarTuna. Features from Duolingo such as game-like interactions and “virtual instruments” will be essential to the learning experience. By incorporating the various minigames implemented by GuitarTuna, we believe the issue of “repetitive exercises” can be resolved. Considering our product is built for various instruments, we will also want to examine the customization of sheet music in a similar fashion to UkuTabs. Allowing our users to resize sheet music and automatically scroll through it would be beneficial. A manual tuning feature similar to GuitarTuna that prompts users to play songs after tuning would help with motivation. While the user-to-user interaction system of UkuTabs is fantastic, we would rather opt for external app compatibility. This would be similar to how GuitarTuna can connect with Spotify, and how with UkuTabs the user can print or save ukulele tabs. Overall, our product will encourage users who strive to learn music at their own pace, and it will create a fun experience that users can customize in a way that suits them.

10. References

Stock Images for Personas:

"Man Full Body Portrait Isolated over White Background, Boy in T Shirt..." *iStock*, www.istockphoto.com/photo/man-full-body-portrait-on-white-boy-in-t-shirt-and-jeans-arms-folded-gm1136212322-302531636. Accessed 2 Feb. 2025.

"Download Premium PNG of Woman PNG Crossing Arms, Business, Transparent Background by Ployploy about ...: People Icon, Mothers Day Pictures, African American Business." *Pinterest*, 20 Dec. 2022, in.pinterest.com/pin/download-premium-png-of-woman-png-crossing-arms-business-transparent-background-by-ployploy-about--817473769882523658/.

Edwards, Vanessa Van. "Body Language Guide - Crossed Arms and 17 More Cues to Know." *Science of People*, 26 Jan. 2025,

Document Format Inspiration:

Becker, Alexandria. "Persona Template 101: How to Create a Buyer Persona." *Picsart Blog*, 28 July 2022, picsart.com/blog/user-persona-template/.

11. Appendices

Apps Used:

Lucid Chart: Diagram Creation

<https://www.lucidchart.com/>

Chat-GPT: Format Inspiration

<https://chatgpt.com/>

Photoshop: Document Design

<https://www.adobe.com/products/photoshop.html>

App Researching:

Duolingo

<https://www.duolingo.com/>

Ukutabs

<https://ukutabs.com/>

GuitarTuna

<https://yousician.com/guitartuna>