

Requirements Document

Jammin Mission Statement

To provide software to aid musicians in composing music as well as give them the power to share and collaborate with fellow composers all around the world.

- Enables composers to discuss and share compositions
 - Assist beginner musicians in creating original compositions
 - Assist beginner musicians in creating backing tracks for songs
 - Assist beginner musicians in practising to play songs
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Introduction

This document contains a list of requirements divided into sections for each of the main components of the proposed Jammin music composition software. It specifies the projects requirements in a language that can be understood by people with a basic understanding of music composition and theory.

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1. Managing Compositions

The system allows users to create and manage a library of compositions. The library can contain audio, midi and Jammin composition files. Jammin composition files can include a combination of audio, midi, song structure and chord information.

- 1.1. **Create** a new Jammin composition containing only an empty master track, with default values for volume, tempo, time signature and key signature.
- 1.2. **Save** a Jammin composition at any time, except during recording and playback.
- 1.3. **Open** Jammin composition file.
- 1.4. **Close** Jammin composition file.
- 1.5. **Importing** music files
 - 1.5.1. Import midi compositions and open as a new Jammin composition.
- 1.6. **Exporting** compositions
 - 1.6.1. Entire Jammin compositions can be exported in multiple file formats
 - 1.6.1.1. midi files – only includes midi tracks
 - 1.6.1.2. wav
 - 1.6.1.3. mp3
 - 1.6.1.4. other common formats i.e. ogg, vorbis
 - 1.6.2. Individual tracks within a composition should be able to be exported in the above formats.
- 1.7. Set and edit the following **composition properties**:
 - 1.7.1. Specify one or more **genres**.
 - 1.7.2. Specify one or more **composers** who worked on the composition.
 - 1.7.3. The **title** which by default is the same as the file name.
- 1.8. **Display** composition library in an expanded hierarchical view for quick opening and sharing of compositions.
 - 1.8.1. **Open** compositions directly from the composition library view.
 - 1.8.2. **Delete** unwanted composition from the library permanently.
- 1.9. **Search** for an existing composition using different criteria.
 - 1.9.1. Title
 - 1.9.2. Composer
 - 1.9.3. Genre
 - 1.9.4. Tempo
 - 1.9.5. Key signature
 - 1.9.6. Instruments

2. Playback Controls

The system allows users to listen to compositions stored in the library.

- 2.1. **Play** the composition from its current position.
- 2.2. **Stop** the composition while it is playing.
- 2.3. **Rewind** the current position in the composition.
 - 2.3.1. **Rewind** to the start of the composition with a single user action.
- 2.4. **Fast Forward** the current position in the composition.
 - 2.4.1. **Skip** to end of a composition with a single user action.
- 2.5. **Looped playback** option – automatically restarts playback from the beginning when playback ends.
- 2.6. **Display current position** in composition.
 - 2.6.1. **Update** current position during playback.
- 2.7. Allow the user to modify the following playback properties:
 - 2.7.1. **Playback Volume** – on a scale of 0% to 100% (full volume).
 - 2.7.2. **Transpose** up to an octave up and down.
 - 2.7.3. **Playback Tempo** – on a scale of 0% - 100% (full volume).
- 2.8. Select **midi output device** to use for playback of midi files.
 - 2.8.1. Allow playback through external devices i.e. Keyboard.
- 2.9. Allow users play a composition from the library without opening it up for modification.

3. User Accounts

The system provides an online mode for sharing and discussing compositions. In order use the online mode users must create a user account.

- 3.1. Users must **register a new account** if they want to use "online mode".
- 3.2. **Multiple accounts** can be created on one computer.
- 3.3. **Accounts** must contain a user profile.
 - 3.3.1. Accounts must be **password** protected. This protection prevents unauthorised users from changing profile details, closing an account and logging into the account. Passwords are user-defined and are alphanumerical. They must be between 4-12 characters in length (inclusive) and are case sensitive.
 - 3.3.1.1. Must provide password recovery-mechanism.
 - 3.3.2. Users must be able to **close** an existing account.
 - 3.3.2.1. Closing an account requires authentication (via password)
- 3.4. **User profiles** contain the following **attributes**:
 - 3.4.1. **Username**: Alphanumerical, these must be unique. Min length of 6 characters and max length of 12. **Not optional**
 - 3.4.2. **Name**: Alphabetical. Max length 32. **Not optional**
 - 3.4.3. **Country**: Selectable from a list. **Not optional**
 - 3.4.4. **Date of Birth**: Range from 1/1/1900-now. **Not optional**
 - 3.4.5. **Sex**: select only from Male/Female. **Not optional**
 - 3.4.6. **Email**: Valid email address format. **Not optional**
 - 3.4.7. **Musical instruments**: Multiple instruments played by the user can be specified. **Optional**
 - 3.4.8. **Specialised genres**: Multiple genres can be specified. **Optional**
 - 3.4.9. **Comment**: Users can add information about themselves. **Optional**
- 3.5. When a user switches to online mode the user must sign in.
- 3.6. **Signing-in** requires the **username** and **password** for authentication.
 - 3.6.1. Users can sign-in their account from any computer with the application installed.
 - 3.6.2. Users cannot sign-in their account multiple times simultaneously.
 - 3.6.3. Users have the option to 'remember' passwords.
 - 3.6.4. **Auto sign-in** when switching to "online-mode" can be enabled.
 - 3.6.5. Users can **switch** between online and offline **mode** at anytime.
- 3.7. The system must be installable and useable with/without the internet.

4. Online Communication

The system allows users to communicate online with fellow musicians. This can be through chat rooms and private conversations.

- 4.1. **Conversations** can either be **public** or **private**.
 - 4.1.1. **Chat rooms** are public conversations which can be joined by all users, and are displayed in a searchable list.
 - 4.1.2. **Private conversations** are not displayed in the room list, and are only accessible via invitation.
- 4.2. **Chat-rooms** display the following **attributes**:
 - 4.2.1. **Description** of room.
 - 4.2.2. **Genre** of room which can be selected from a list or typed.
 - 4.2.3. **Maximum number** of users who can be in a room at once.
 - 4.2.4. **Current number** of users in room.
 - 4.2.5. **List of users** currently in room.
- 4.3. **Chat-rooms** can be **accessed** via:
 - 4.3.1. **Searching** by chat room attributes.
 - 4.3.1.1. Results can be ordered ascending/descending by any of the attributes.
 - 4.3.2. **Browsing** by genre.
 - 4.3.3. **Invitation** of other users in the rooms.
- 4.4. Users can simultaneously **join** multiple chat rooms.
- 4.5. For both private conversations and chat-rooms:
 - 4.5.1. Users can **leave** conversation at any time.
 - 4.5.2. Users can send text to **all** conversation participants.
 - 4.5.3. Users can send text to a **specific user** in a conversation so that no one else can see the message.
 - 4.5.4. Users can view all the messages they have sent and received in all conversations.
 - 4.5.5. (Non-Functional) Messages in conversations should be instantly sent to **all users** at the **same time**.

5. Friends

The system allows users to specify other users as their friends. Users can see when their friends are online and can communicate conveniently with them.

- 5.1. Users can have a **'friends' list**, which can be accessed from any machine.
 - 5.1.1. Friends list is only visible and usable in on online mode.
- 5.2. Friends can be **added**:
 - 5.2.1. **Manually** by typing in the friend's username.
 - 5.2.2. By **browsing** for other users by:
 - 5.2.2.1. Country
 - 5.2.2.2. Specialised instruments
 - 5.2.2.3. Genres
 - 5.2.3. By **searching** for users by all user profile attributes except comment.
 - 5.2.3.1. Users can choose if they are searchable or not.
 - 5.2.4. A user cannot add themselves as a friend.
- 5.3. When a user attempts to add another user as a friend an invitation is sent. The invitation recipient can choose to:
 - 5.3.1. **Accept** the invitation. The two users are then added to each others friend's lists.
 - 5.3.2. **Decline** the invitation. The two users are not added to each others friend's lists.
 - 5.3.3. **Postpone** the decision of accepting or declining the invitation to a later date.
 - 5.3.3.1. Before becoming "friends", the invitation recipient must accept the invitation.
 - 5.3.4. The user sending the 'friend request' can **cancel** the invitation. The invitation recipient is alerted of the cancellation.
- 5.4. Users can **delete** other users from their friend's list.
- 5.5. **Private conversations** between friends are initiated without the receiving friend having to accept an invitation to join the conversation.
- 5.6. Users **E-mails** must not be revealed to any other user to protect the user's **privacy**. Emails must only be used internally.

6. Sharing Compositions

The system allows users to send compositions over the internet to other users. Users can also receive and listen to other users' compositions.

- 6.1. Only audio, midi, and Jammin compositions may be sent to avoid people using the software as a file sharing application.
- 6.2. Users can **send** to another user:
 - 6.2.1. A full composition
 - 6.2.2. A single track
- 6.3. Users can **send and receive** multiple compositions/tracks simultaneously.
- 6.4. The composition sharing process can be **cancelled** at any time up until completion.
- 6.5. Users being sent compositions or tracks receive an invitation to download.
 - 6.5.1. The invitation must be **accepted** before the sharing process commences.
 - 6.5.2. The invitation may be **declined** by the recipient.
 - 6.5.3. The invitation may be **cancelled** by the sender.
 - 6.5.4. The invitation specifies the **amount** of data to be transferred
- 6.6. During a transfer both users can view the **progress** if they wish.
- 6.7. After the transfer has completed both users are notified.
- 6.8. Data transfers are done in the **background**

7. Track Generation

The system allows users to create compositions with more than one instrument playing at a time. Each of these instruments is contained on a separate track. The different types of tracks include audio, chord, note and beat tracks. The system allows users to modify and add tracks to a composition.

- 7.1. Users can create a **new** music track of a specified **type**.
- 7.2. Users can set and modify the following track **properties**:
 - 7.2.1. **Track volume**
 - 7.2.2. **Mute** – temporarily set track volume to 0.
 - 7.2.3. **Solo** – temporarily set the volume of non solo tracks to 0.
 - 7.2.4. **Instrument** to play a track.
 - 7.2.5. Meaningful **names** for easy recognition of track contents.
 - 7.2.5.1. By default name is set to the instrument name.
- 7.3. The following general **track editing** features are available to users:
 - 7.3.1. **Add** music data to particular to track type with a similar method for all track types.
 - 7.3.2. **Play** notes as user adds and modifies track data.
 - 7.3.3. **Undo** track data additions and deletions.
 - 7.3.4. **Redo** track data additions and deletions.
 - 7.3.5. **Duplicate** existing track
- 7.4. Users can **select** all or a portion of a track and perform the following operations:
 - 7.4.1. **Playback** the selected portion.
 - 7.4.1.1. Looped playback of a selection is also allowed.
 - 7.4.2. Shift **pitch** up or down
 - 7.4.3. Shift **start position** left or right
 - 7.4.4. Add, remove and modify track **effects**
 - 7.4.4.1. Specify type
 - 7.4.4.2. Specify parameter values
 - 7.4.5. Modify **volume** i.e. add dynamics
 - 7.4.5.1. Set to a fixed value
 - 7.4.5.2. Alter by a fixed amount
 - 7.4.5.3. Alter by a relative amount
 - 7.4.6. **Edit** selection in the following ways:
 - 7.4.6.1. **Delete** all track data in the selection.
 - 7.4.6.2. **Silence** track selection – this removes all the track data but does not shift the position of subsequent track data.
 - 7.4.6.3. **Insert empty** beats into a track.
 - 7.4.6.4. **Copy** music data to the clipboard.
 - 7.4.6.5. **Cut** – copy to the clipboard and delete the selected data.
 - 7.4.6.6. **Paste** copied music data into the active track's current position.

8. Track Display

The system will allow users to view the tracks in their composition. The contents of each track will be displayed in a manner that will allow for easy editing and viewing.

- 8.1. Users can view track **properties** described in the preceding section.
- 8.2. Users can view track **data** in a form that is clear and allows them to edit multiple tracks simultaneously.
 - 8.2.1. Users can view tracks with **minimised view** which hides the details but gives a general overview of a track's content.
 - 8.2.2. Users can view a track in the **expanded view** which displays track details as well as well as allows the user to edit the track.
- 8.3. The **current position** in the track is displayed.
 - 8.3.1. The current position is **updated** during playback i.e. by highlighting notes or moving a vertical bar or ball.
- 8.4. **Volumes/dynamics** for track data are displayed.
- 8.5. **Effects** for track data are displayed.
- 8.6. User can **zoom** in and out on tracks in expanded view mode.
 - 8.6.1. **Vertical** zooming
 - 8.6.2. **Horizontal** zooming
- 8.7. Users can **print** track contents:
 - 8.7.1. Print a single track.
 - 8.7.2. Print one or more tracks combined.
 - 8.7.3. View a print preview first.
 - 8.7.4. Specify level of detail to be printed.
- 8.8. Offer a standard **piano roll** as alternative view for chord, note and beat.
- 8.9. User can enter highlight mode to highlight parts of the song that need attention with a user specified colour.

9. Master Track

A composition contains exactly **1** master track. The master track contains the chords and other composition properties such as tempo and key.

9.1.1. They may contain multiple sets chords progressions but only one is selected as active and is used in playback and exporting.

9.2. Users specify the following information for each chord:

9.2.1. **Duration** – number of beats the chord lasts for

9.2.2. **Name** i.e. A, B, C, D, E, F, G

9.2.3. **Type** i.e. major, minor, 7th

9.2.4. **Bass** – if different from the root i.e. C/D

9.2.5. **Inversion** i.e. root, 1st inversion, 2nd inversion

9.3. Chords are colour coded and/or labelled

9.3.1. Predicted chords are displayed differently from others.

9.4. Users can **drag and drop** chords onto a track

9.5. Choosing a **key** displays the common chords for that key

9.5.1. Users can use the **key analyser** tool to automatically determine and set a song's key based on the notes contained in a specified note track.

9.5.1.1. User can auto detect all keys in a song with key changes.

9.5.2. User can additionally select a chord style i.e. Jazz, to display the common chords for that style and the selected key.

9.6. **Recently used** chords are displayed where they can be added to the track with a single action i.e. click & drag.

9.7. Users set and modify the initial value for the following composition features:

9.7.1. Composition Key

9.7.1.1. Allow mid composition changes.

9.7.2. Time Signature

9.7.2.1. Allow mid composition changes.

9.7.3. Chord Style i.e. pop, jazz, eastern

9.7.3.1. Allow mid composition changes.

9.7.4. Tempo

9.7.4.1. By specifying the number of beats per minute.

9.7.4.2. By tapping a key or mouse button at the desired tempo.

9.7.4.3. Allow mid composition changes.

9.7.5. Master Volume

9.7.5.1. Allow mid composition changes.

10.Chord Track

Chord tracks provide an implementation of the chords in the master track using a specific instrument. Chord tracks also contain information about the strum or rhythm to be used to play each of the chords.

10.1.The user can specify the type of **instrument** to be used for the track:

10.1.1.Guitar

10.1.2.Strings

10.1.3.Brass

10.1.4.Piano

10.1.5.Bass

10.2.Users can select an instrument dependant **chord rhythm** to be played for each chord.

10.2.1.A predefined library of chord rhythms will be available for each instrument.

10.2.2.A simple interface will be provided to allow users to define additional chord rhythms.

10.2.3.Users can request suggestions of appropriate strums based on the beat and note tracks.

11.Note Track

Note tracks can contain notes that can be displayed and edited on a musical stave. This allows users to create a song melody or harmony.

11.1.User can view and edit **staves** displaying the following details:

11.1.1.Bar lines

11.1.2.Ledger line

11.1.3.Bar numbers

11.1.4.Clefs

11.1.4.1.G clef (treble)

11.1.4.2.F clef (bass)

11.1.4.3.C clef (alto, tenor)

11.1.5.Time signatures

11.1.5.1.Simple time signatures - 4/4, 2/2, 2/4, 3/4, 6/8

11.1.5.2.Compound and complex time signatures – 6/8, 9/8, 12/8, 5/4

11.1.6.**Key** – accidentals displayed on the stave.

11.1.6.1.View music in key of B & E flat instruments.

11.1.7.Dynamics

11.1.7.1.Crescendo / Decrescendo

11.1.7.2.ff, f, mf, mp, p, pp

11.1.8.**Tempo changes** - ritardando & a tempo.

11.2.User can view and edit **notes** on a stave the following details:

11.2.1.**Chords** – groups of 2 or more notes being played at once.

11.2.2.**Arpeggios** – chords with notes played sequentially.

11.2.3.**Precision** up to semi-quaver.

11.2.3.1.Grouped quavers and semi quavers with bars on top.

11.2.4.**Accidentals** – sharps, flats and naturals.

11.2.5.**Rests** – for sections of a track where no notes are played.

11.2.6.Timing related

11.2.6.1.Dotted notes

11.2.6.2.Triplets

11.2.6.3.Ties

11.2.6.4.Fermata

11.2.7.Expression marks

11.2.7.1.Ornaments

11.2.7.2.**Articulation** – staccato, accents

11.2.7.3.Slurs

11.3.Users can **record** into an active note track at the current position from a **midi input** connected to an external midi instrument i.e. keyboard.

11.3.1.User can chose to use a **metronome** for a recording session.

12. Beat Track

Beat tracks provide a convenient method for viewing, creating and modifying drum and percussion tracks.

- 12.1. Users can select percussion instruments to be used in the track.
 - 12.1.1. Users can select a predefined drum and percussion kits.
- 12.2. Users can quickly and easy enter beat positions and lengths into a track
 - 12.2.1. Users can enter several beats with the same length and fixed spacing with a single set of simple actions.
- 12.3. **Drum Loops** – a defined beat pattern that can be used to simplify addition of repeating beat pattern.
 - 12.3.1. Users can manually create loops.
 - 12.3.2. Users can save and load manually created loops.
 - 12.3.3. Users can load loops from a predefined library.
- 12.4. Users can **auto generate** a beat track by selecting:
 - 12.4.1. Chord track to use in determining suitable beat patterns.
 - 12.4.2. One or more note tracks to use in determining beat patterns.
 - 12.4.3. The predefined percussion kit to use for the beat track.
- 12.5. Users can **record** into an active beat track at the current position from a **midi instrument** connected to an external midi instrument i.e. keyboard.
 - 12.5.1. Users can choose to use a **metronome** for a recording session.

13.Audio Track

Audio tracks provide a convenient method for viewing audio tracks such as wave and mp3 files.

13.1.Users can **record** into an active audio track at the current position from the computers **line in** or **microphone** inputs.

13.1.1.Users can choose to use a **metronome** for a recording session.

13.2.Users can create audio tracks by importing existing audio files.

14. Composition Tools

The system will include tools which assist users in composing songs.

14.1. Chord Analyser

14.1.1. Tool for creating chord tracks based on the notes in one or more note tracks.

14.1.2. With limited note information specify auto generation method.

14.1.2.1. Predict chord based on key.

14.1.2.2. Leave blank.

14.1.2.3. Continue with previous chord.

14.1.3. Allow the user to accept predicted chords.

14.1.3.1. Request a second suggestion.

14.1.3.2. Reject a chord suggestion i.e. delete the chord.

14.2. **Song Phrases** – allow users to compose song phrases separately and in any order then specify the compositions structure later.

14.2.1. **New** phrases can be added to a composition.

14.2.1.1. Users must specify a unique phrase name.

14.2.1.2. A new phrase can be empty.

14.2.1.3. A new phrase can be based on a replica of an exiting phrase.

14.2.2. Users can specify a particular phrase to view, edit and playback.

14.2.2.1. Users can also choose to display the whole composition.

14.2.3. Phrases can be **deleted**.

14.2.4. The phrase **order** to be used in playback and exporting can be set and modified. i.e. V1, chorus, bridge, V2, chorus

14.3. **Randomize** - Users can add randomness to the notes in specified composition tracks to make them sound less mechanical and more natural.

14.3.1. User specifies randomization parameter for **note volumes**.

14.3.2. User specifies randomization parameter for **note timings**.

14.4. **Quantize** – align selected midi notes to a specified timing grid.

14.4.1. Specify the quantizing resolution.

14.4.2. Specify quantizing percentage.

14.5. **Harmonize** – automatically add a harmony to a specified note track.

14.5.1. Produce a harmony for a track based on either:

14.5.1.1. Key signature and style.

14.5.1.2. Chord track.

14.5.2. Specify number of notes to harmonize above and below the melody.

14.6. **Wave to Midi** - Sing or play in a part and convert to a midi track with a single note at a time.

15.Help

The system will provide written information to assist users in composing songs and using the system.

15.1.**Help Manual** will contain the following sections:

- 15.1.1.An easy to use navigation system.
- 15.1.2.A brief overview of the software's features.
- 15.1.3.A quick start guide allowing users to begin composing and sharing music by going through a 30 minute introduction tutorial.
- 15.1.4.15-30 minute tutorials for each of the basic features.
- 15.1.5.Detailed descriptions of all the software's features.

15.2.**Keyboard Shortcuts**

- 15.2.1.Users can view a help page listing all keyboard shortcuts by task.
- 15.2.2.Users can enter a mode in which they can view appropriate keyboard shortcut information while undertaking a particular task.
- 15.2.3.Provide easy access to viewing keyboard shortcuts.

15.3.**Assisted Modes**

- 15.3.1.Beginners can enter a mode allowing them to click on user interface items to get a description of how to use them.
- 15.3.2.Beginners can enter a mode in which they can view appropriate help information while undertaking a particular task.

15.4.**Chord and Theory Information**

- 15.4.1.Beginners can view edited wikipedia articles that will help them in using the composition tools, by teaching them more about:
 - 15.4.1.1.Basic chord theory.
 - 15.4.1.2.Stave notation theory.
- 15.4.2.Musicians can view a list and description of the chords that fit the current key and style or a user specified key and style.
 - 15.4.2.1.Guitarists can view chords in guitar tabs format.
 - 15.4.2.2.Pianists can view chords on a stave or picture of piano keys.
- 15.4.3.Musicians can view highlighted notes and chords on a piano with their names and position on a musical stave.
- 15.4.4.Musicians can view charts displaying fingerings for notes on a stave for other musical instruments including:
 - 15.4.4.1.Saxophone.
 - 15.4.4.2.Clarinet.
 - 15.4.4.3.Trumpet.