

# FUNCTIONAL SPECIFICATION

by

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# Introduction

## General Description

This project is a music application aimed towards musicians that write and record their own music. The user will be able to run the application on their computer or laptop. When the application is run, the user will be able to record a piece of music and save the audio. When they save the clip of music, the application will then transcribe the piece of music to tablature form. The projects aim is for guitarists to easily write, record, read, and playback music they have written.

# Audio and tablature files

## Concept

In this application, an audio file will be saved by the user after recording a piece of music. This file will then be analysed by the programme and transcribed into tablature notation. The notation will be displayed for the user so they can see what notes they played in the audio file they have saved.

## Problems

There are a few problems that can arise from converting an audio file to tablature. One of the biggest problems is the loss of accuracy. Although the audio file will not lose any data, the conversion over to tablature could lose some data as it will be impossible to get the tablature 100% right every time. Certain features are not considered in tablature notation, like timing. There is no time domain in tablature which means the notes will show but it can't tell you exactly when to play it.

It is possible that the tablature will be missing some notes or the notes are not in the correct place. This is because in each frequency of a note there is frequencies present. For example, in an E note, there is a B note frequency present, which can show up in the transcription, throwing off the accuracy.

Another problem from converting an audio file to tablature comes from bad recordings. An audio with a bad recording can mean anything from using a low quality microphone, noise in the background making the audio unclear, or even the audio being too quiet. This will make it hard for the application to convert the audio into a tablature form for the user. If a bad recording is converted into tablature form, the tab will most likely be inaccurate.

## File management

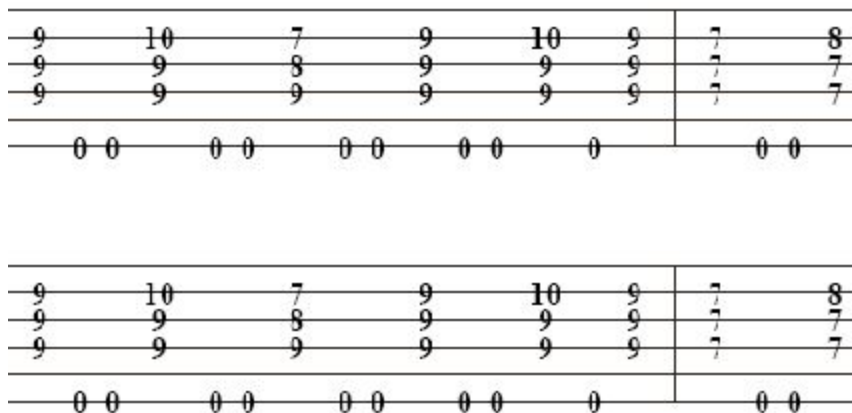
When a user creates a new recording, the audio file that the sound data is saved to will be saved to a designated folder on the user's computer/laptop. This folder will be saved in with the other files the programme owns. If the user chooses to delete the recording, they will not be able to recover it. The user will be able to delete the recordings from the "Recordings" screen. When a recording is deleted, the tablature data will also be deleted. The local folder that the recordings are stored in is in the working directory labeled "Recordings". Each time a user either saves a new file or deletes a file, this designated folder will be updated. This way the user will have full access to the audio file they have created. By using this form of file management, all audio files will be saved to the user's computer/laptop locally.

## Tablature management

The tablature created for each recording will be stored locally in a folder labeled "Tabs", the same way the audio files are saved. The tablature data will be stored in a JSON file. The structure of the JSON file will look like this "filename.wav : { time : note }". This structure is to easily find the data of an existing file and stores the notes being a played and the time the note was played.

Each time a user either creates a new file, the "Tabs" folder will be updated with a new JSON file. When the user deletes an audio file, the corresponding JSON is also deleted. By using this form of file management, all tablature files will be saved to the user's computer/laptop locally and will be deleted when a recording is deleted.

Each recording will create its own tablature data, that it will be stored in a JSON file. The tablature will be accessible through the application in the "Recordings" screen. The user will be able to listen to the recording in this screen and be able to view how it is played.

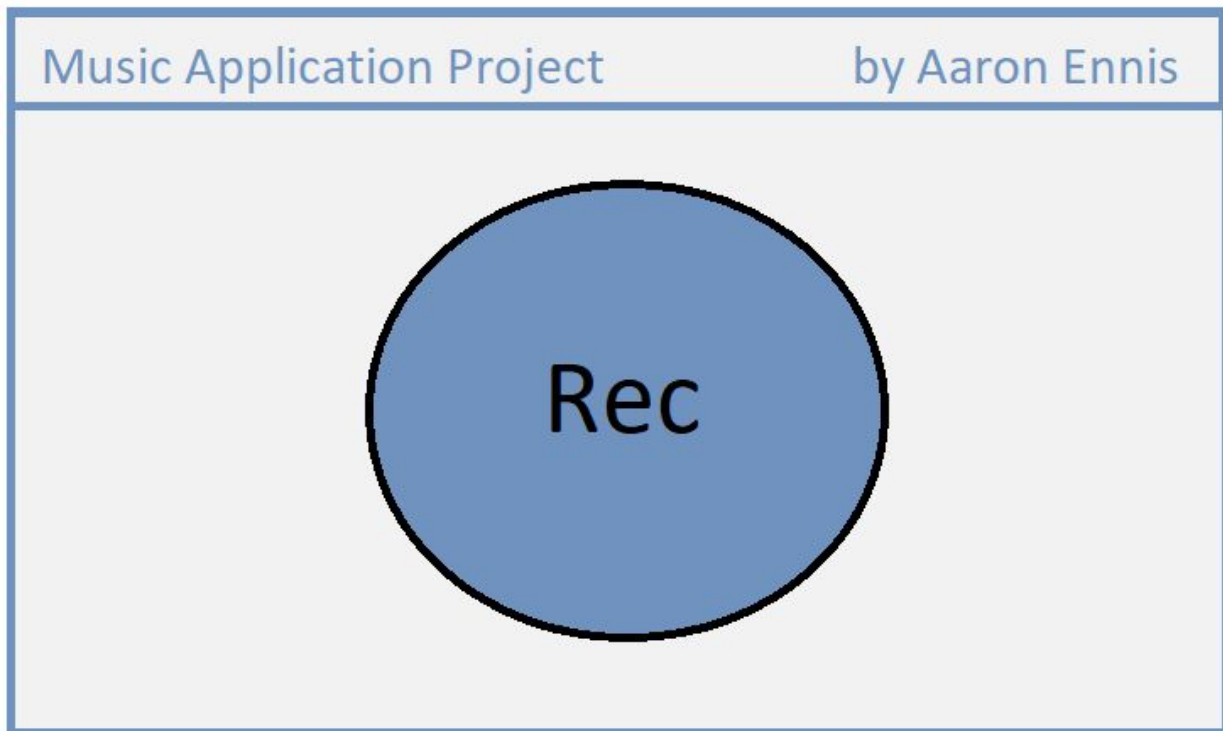


[Fig. 1]

## End Product

### Screens

#### Home Screen (No Recordings)

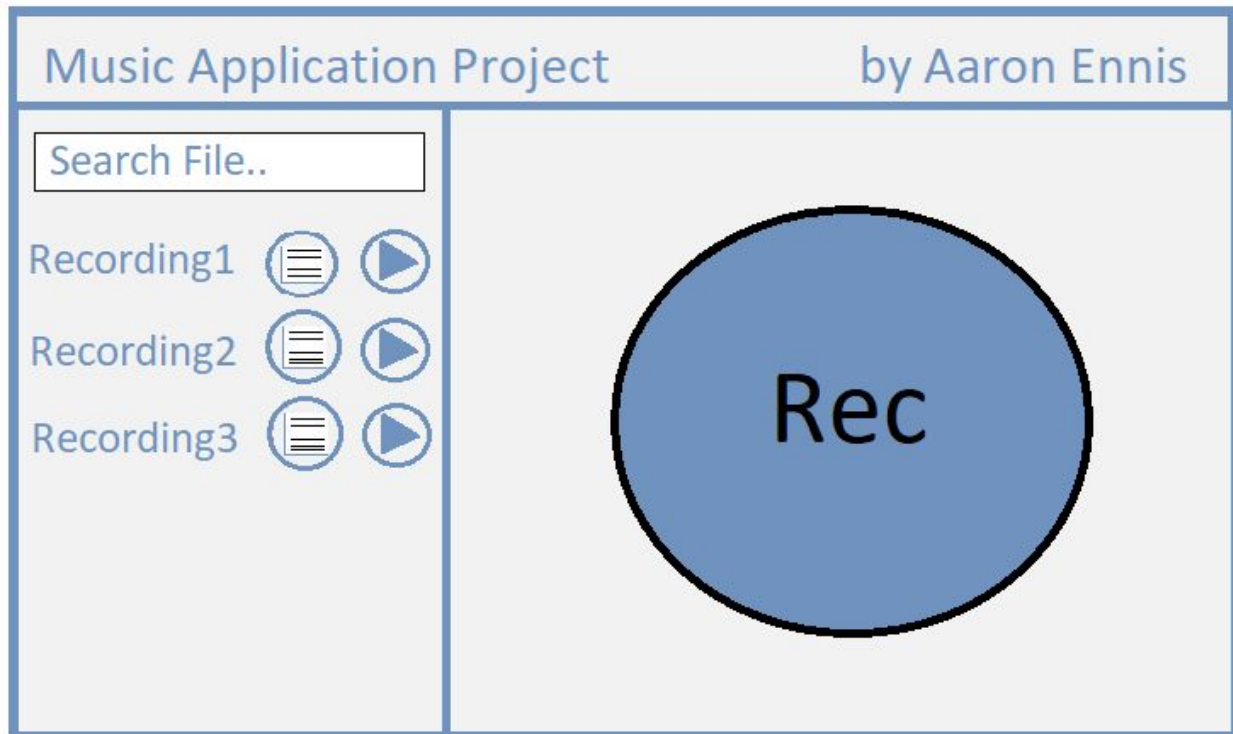


Screen number: 1

#### Description:

This screen is the first thing a new user will see. This is the home screen when there is no saved recordings in the recordings folder. The user is able to click the record button to create their first recording.

## Home Screen

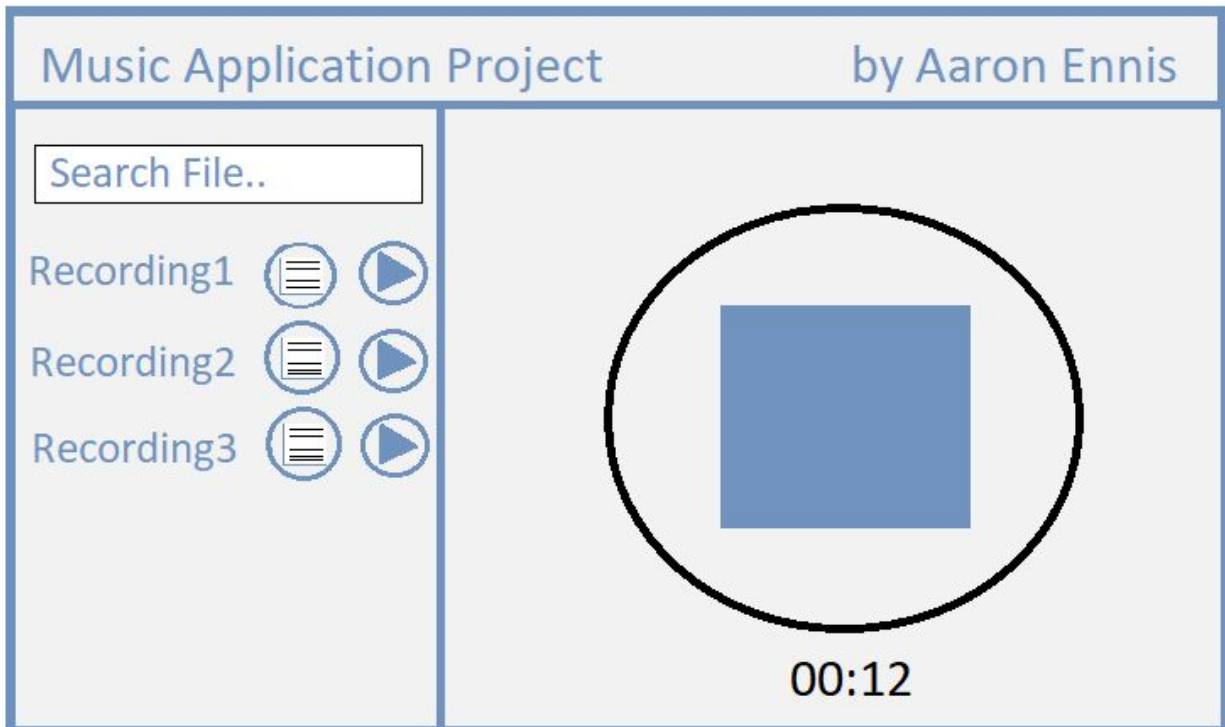


Screen number: 2

Description:

This is the home screen displayed to a user when they have saved recordings. To the left of the screen the recordings are displayed. Above the recordings, there is a text box which is a search box for the audio files. There are two buttons beside the recordings. The first button (on the left) will show the tablature for that recording. This is the "Tab" button. The second button (on the right) will play the audio of the recording. The user will also be able to record a new recording with the "start recording" button on the right of the screen.

## Recording Screen



Screen number: 3

Description:

This screen will be displayed when a user begins to record a piece of music. When the user wants to stop the recording, they can click the "stop recording" button. The time below the "stop recording" button is the length of time the recording has been playing.



## End Recording Screen



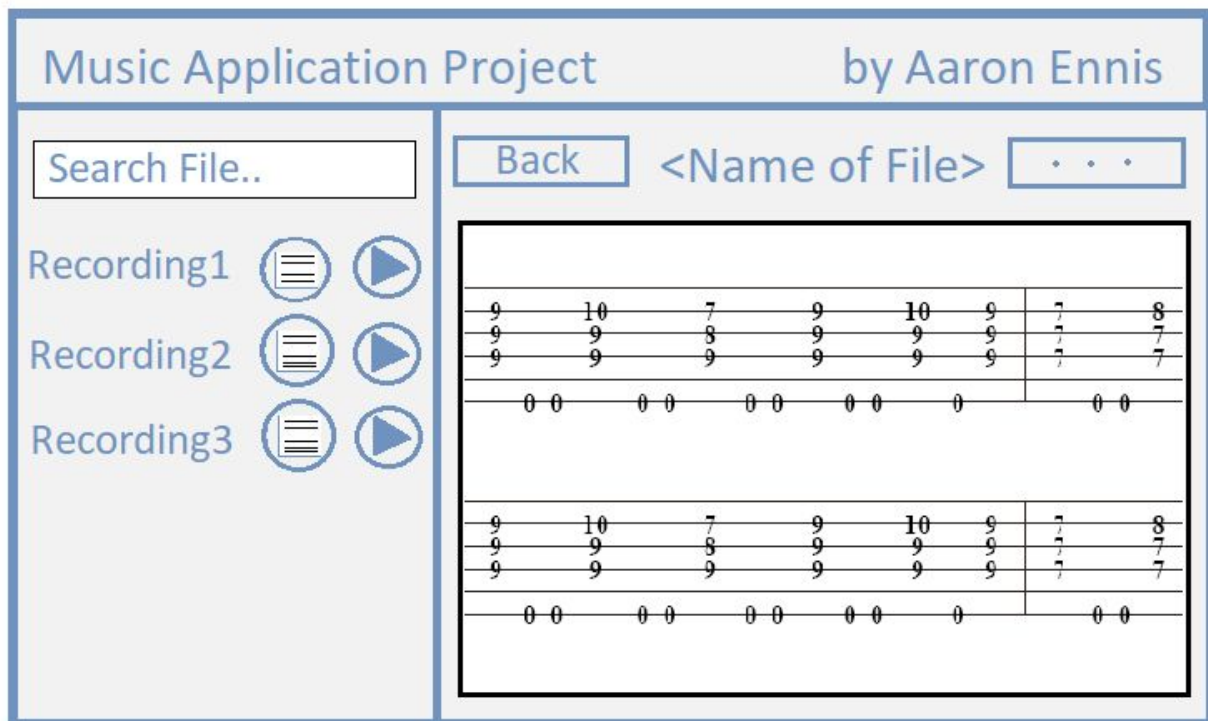
The image shows a wireframe for the 'End Recording Screen'. It is a rectangular window with a light gray background and a blue border. At the top, there is a header bar with the text 'Music Application Project' on the left and 'by Aaron Ennis' on the right. Below the header, the main content area contains the text 'Name of recording' followed by a white rectangular text input field. At the bottom of the screen, there are two buttons: 'Save' on the left and 'Discard' on the right.

Screen number: 4

Description:

This screen is displayed to a user after they have completed a recording. It is a pop up screen. The text box below the button will be used to name the recording. The user will have the option to either save or delete their new recording with the two buttons at the bottom of the screen.

## Recordings Screen

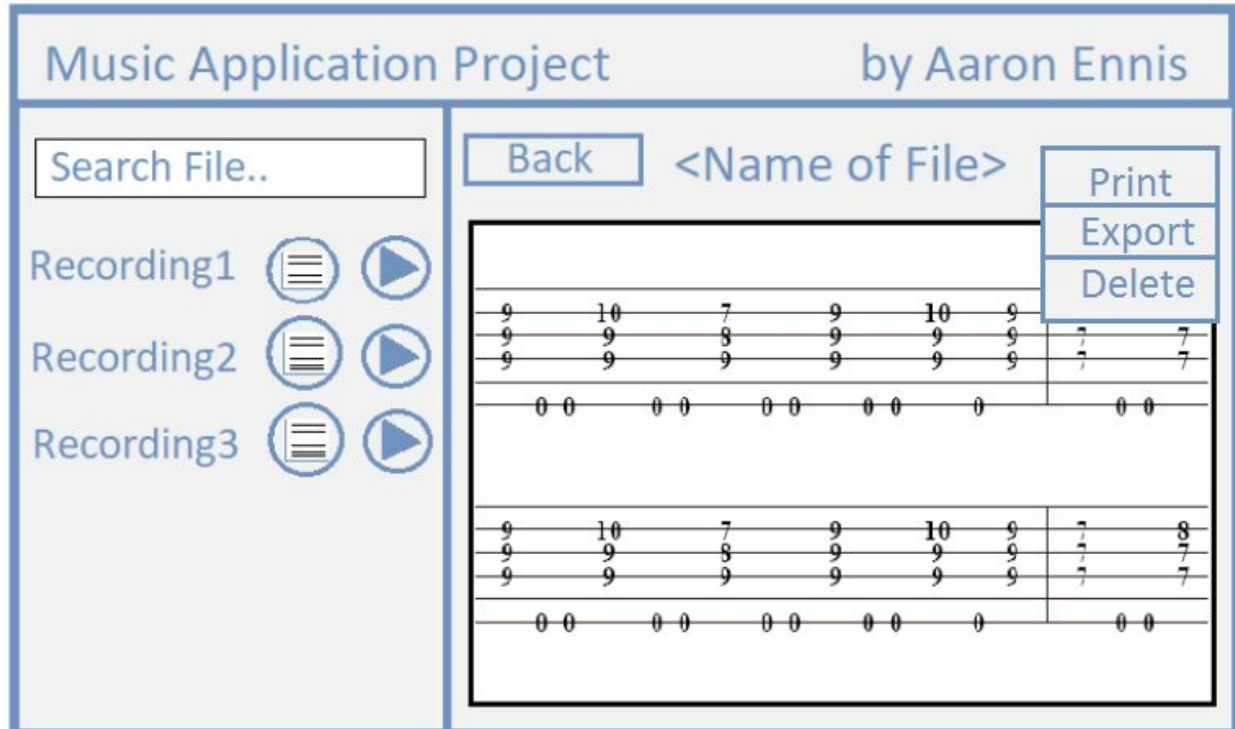


Screen number: 5

**Description:**

This screen will be displayed to the user when they click the “Tab” button beside a recording on the home screen. The “Back” button at the top left of the screen will bring the user back to the home page of the application. The “Options” button at the top right of the screen will give the user the options to delete, export or print the tab and audio file. The placeholder “<Name of File>” will be replaced by the name of the recording. On the right of the screen, the user can see the tablature created by the application for the recording.

## Options Screen



Screen number: 6

## Description:

When the options buttons is clicked in the recordings screen, drop down box is displayed in its place. It gives the user the option to either print, export or delete the tab and recording. If the user selects the "Print", they will have the ability to print the tablature notation so they can use or view it outside of the application. If the user selects the "Export" option, they will be able to export both the audio file and the tab together. This allows them to be able to send the audio and tab file to another device. The last option is to delete the audio and tab files. All of these options will produce a pop up screen for confirmation from the user before going through with the action.

## Path of screens

This is the path a user will take when navigating the screens. The screens are number above and these paths are based on the number given to each screen.

For a new user:

1, 3, 4, 2, 5 optionally 6.

For existing user:

2, 3, 4, 5, optionally 6

For a user with no saved recordings:

1, 3, 4, 2, 5 optionally 6.

Screen 6 is optional as the user does not need to use this screen unless desired. The 5 other screens are all necessary in using the application.

# Supplementary Specification

## Functionality

The application will require the user to have free space on their hard drive as each time a new audio file and tablature file is saved, it will be saved locally.

## Usability

A new user using the application for the first time should be able to navigate it easily within the first minute of use. The application should be easy for the user to navigate without confusion due to its simple design.

## Reliability

If a problem occurs with either saving a file, or converting the audio file to tablature, the application should stay responsive and an error message should appear to warn the user of the error.

If an error occurs, the error message should be accurate and easily readable for the user to understand.

## Performance

The application should open without a delay. Each of the files that the user has saved should also open without delay within the application.

## Supportability

This application will be able to run on Windows devices.

The application will be easily installed onto a device as each component will be the same package that a user can download. The dependencies for the application to run will be easy to install and the application will come with a step by step guide in getting a user started.

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The user is limited to the number and size of recordings based on how much free space they have on their hard drive.

The user is required to have a microphone/microphone port on their device to create a recording.

The user is required to supply their own guitar.