

Homework 2: Song Composer Report Draft

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1 Description

This project utilizes the AVR Butterfly through the terminal to allow a user to enter songs, along with a title and author, and play them back.

This document serves as the first draft of the project report. The submission for the first week only requires the functions in `music.c` to be implemented along with an example for a proof of accuracy. The current version of the project implements functional menu printing and option selecting features. The functions called from the menu include printing out the list of songs, and creating and playing hard-coded songs. To play a song, the current version requires the user change the string in the source code rather than the command line.

Portions of the code have been commented out to exclude declarations from `<avr/io.h>` and other AVR-GCC libraries. The current version of the code is configured to build and run on GCC for debugging, until the final version is ready. All the I/O functionalities currently uses `stdin` and flushes output to `stdout` and `stderr`.

2 Library Functions

The `music.c` file contains the functions required for converting the user inputs to notes.

2.1 User Inputs to Notes

Notes comprise of an ASCII character, (A-G, and R) and a duration of the note (0-31). They are converted from user inputted strings to `uint8_t` by left-shifting the integer value mapped to the ASCII character by 5 bits and adding the duration.

Unpacking the notes is possible by right-shifting by 5 bits to retrieve the ASCII character or by bitwise and-ing with `0x1F` (0001 1111) to retrieve the duration.

3 Code

The C scripts used for the implementation has been attached alongside the report.

3.1 `music.h`

Header file that contains all the constants and the declarations for the functions in the program.

3.2 music.c

Implements the functionality for handling packing and playing songs.