CHOREOGRAPHING EVENTS

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Project Definition

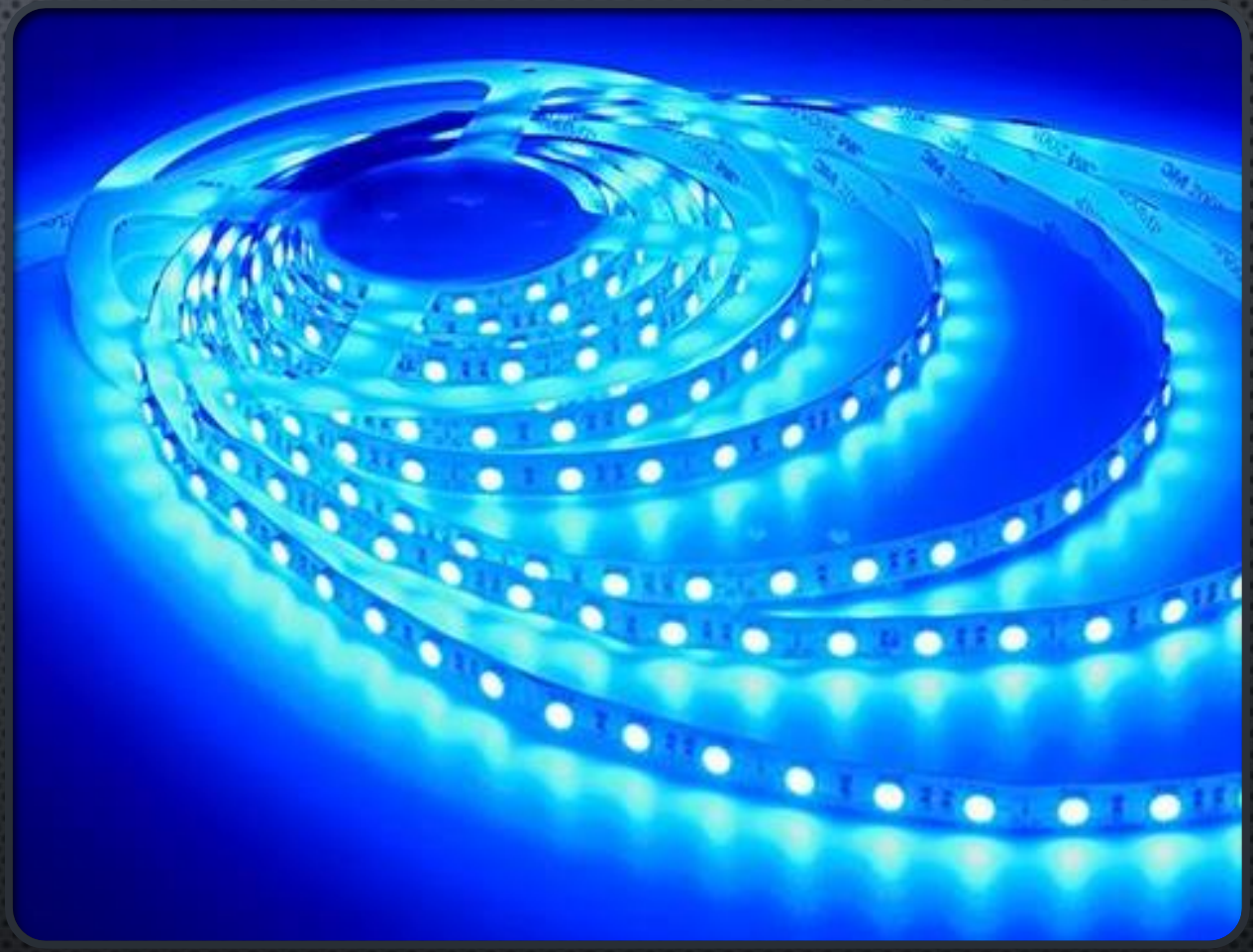
Design an application that allows a user to make events occur at certain times during the playing of an audio file.

General Requirements:

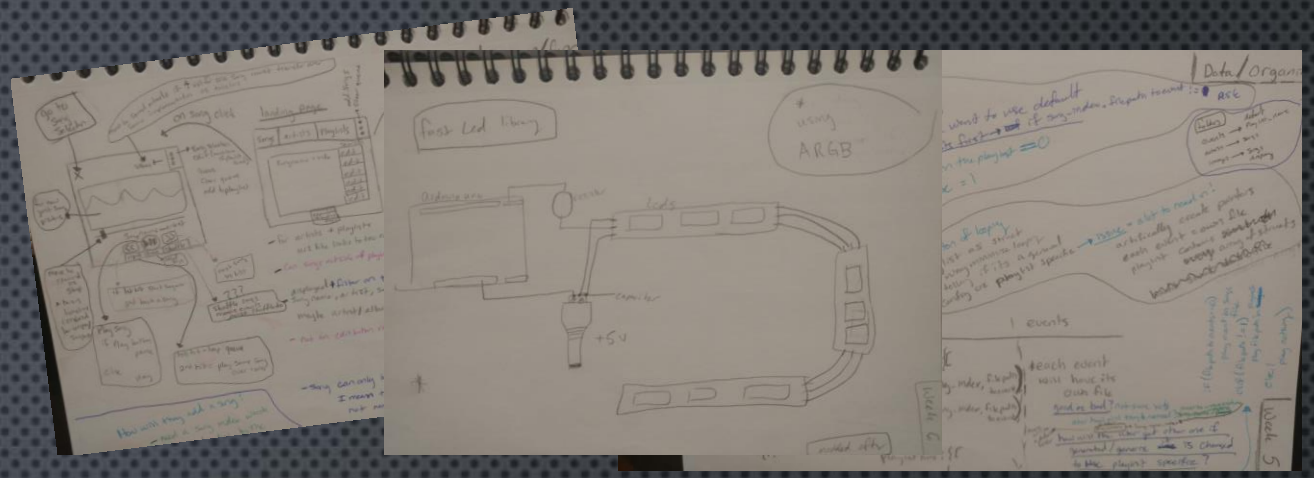
- The application should synchronize the sound with the events.
- Write an editor for the application that allows a user to create, play, save, open, close, copy, search, etc… a music file with its choreographed events.

MY APPROACH

AN APP THAT ALLOWS THE USER CONFIGURE LED LIGHT SHOWS TO AUDIO FILES

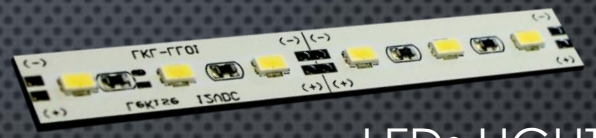


THE PROCESS



1. Began by researching audio files structure, storage, and manipulations
2. Decided on Technologies
3. watched a demo of a crud app being built with WPF, XAML, C#, and SQL
4. Then split the requirements into smaller applications: Event Editor, Music Player, Song Display, Add/edit Songs
5. Mapped out each of the smaller application out in my sketch book

IMPLEMENTATION AT A HIGH LEVEL



LEDs LIGHTS

SONG DATA

Microsoft SQL Server

USER APPLICATION

Visual Studio

SONG EVENT DATA

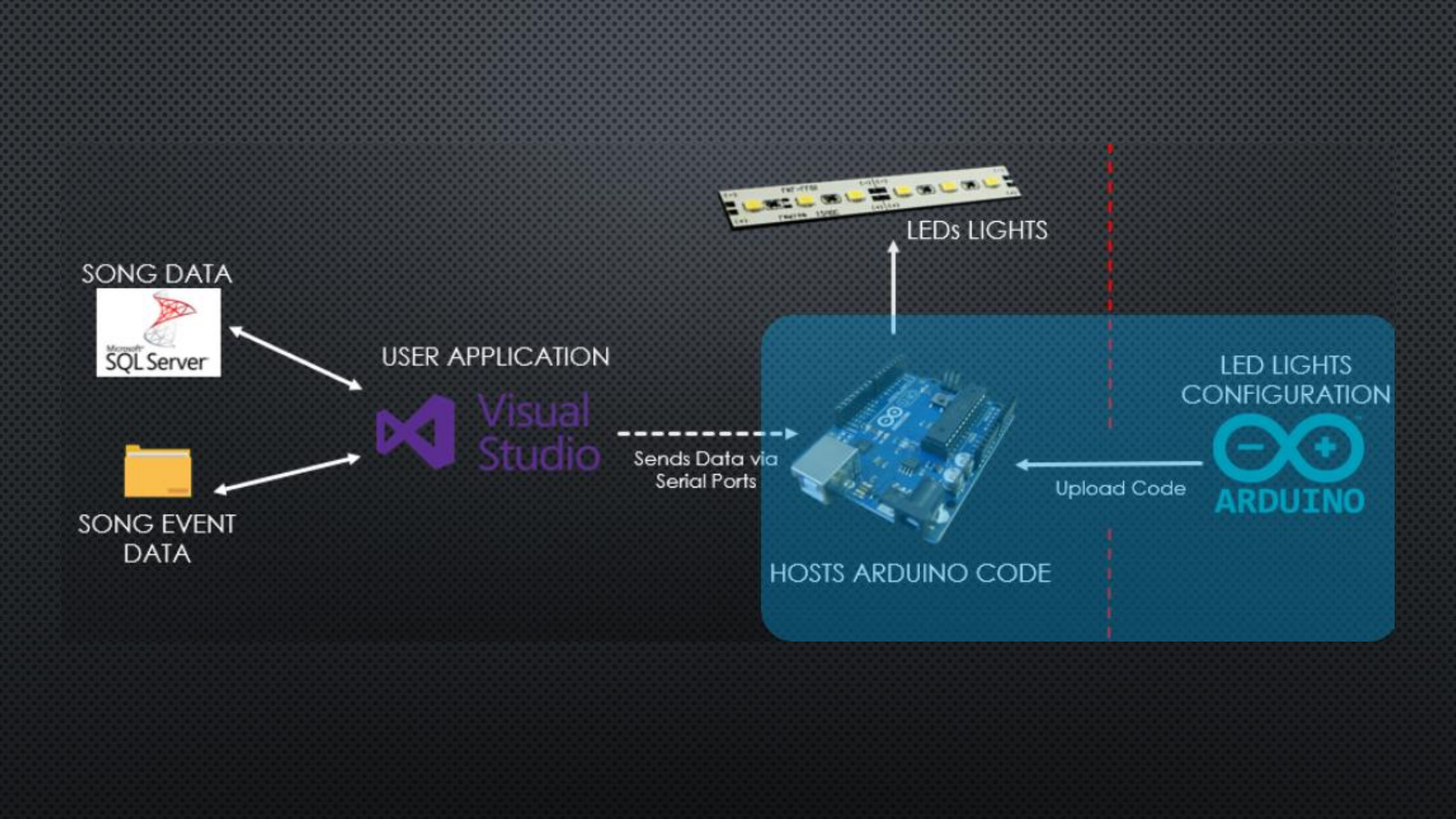
Sends Data via Serial Ports

HOSTS ARDUINO CODE

Upload Code

LED LIGHTS CONFIGURATION

ARDUINO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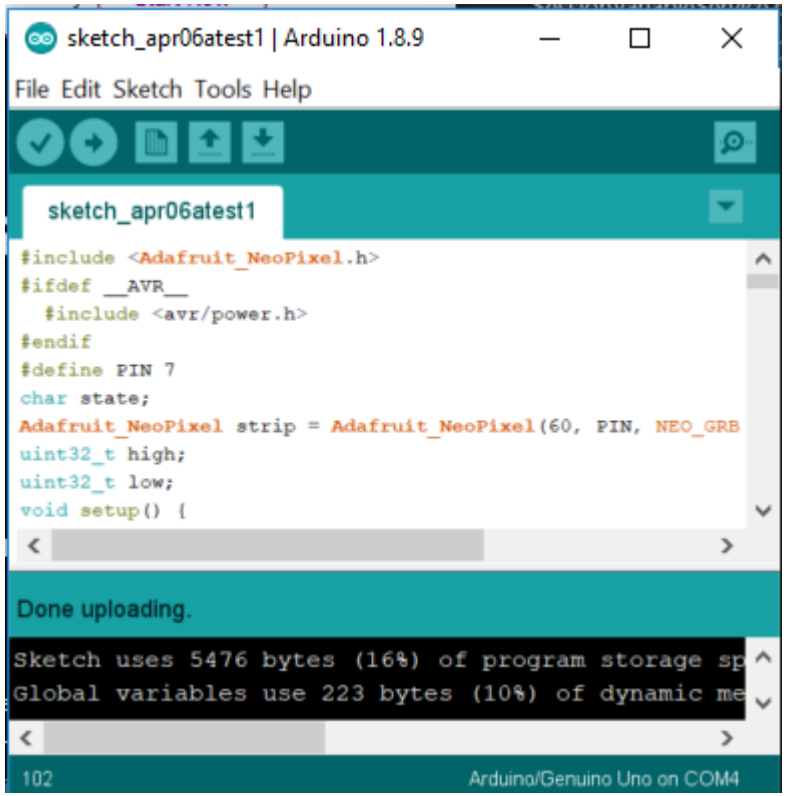
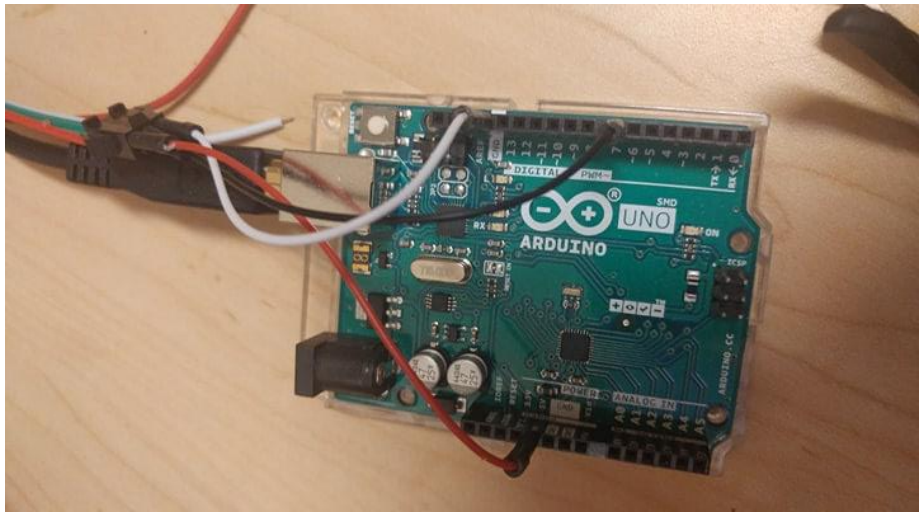
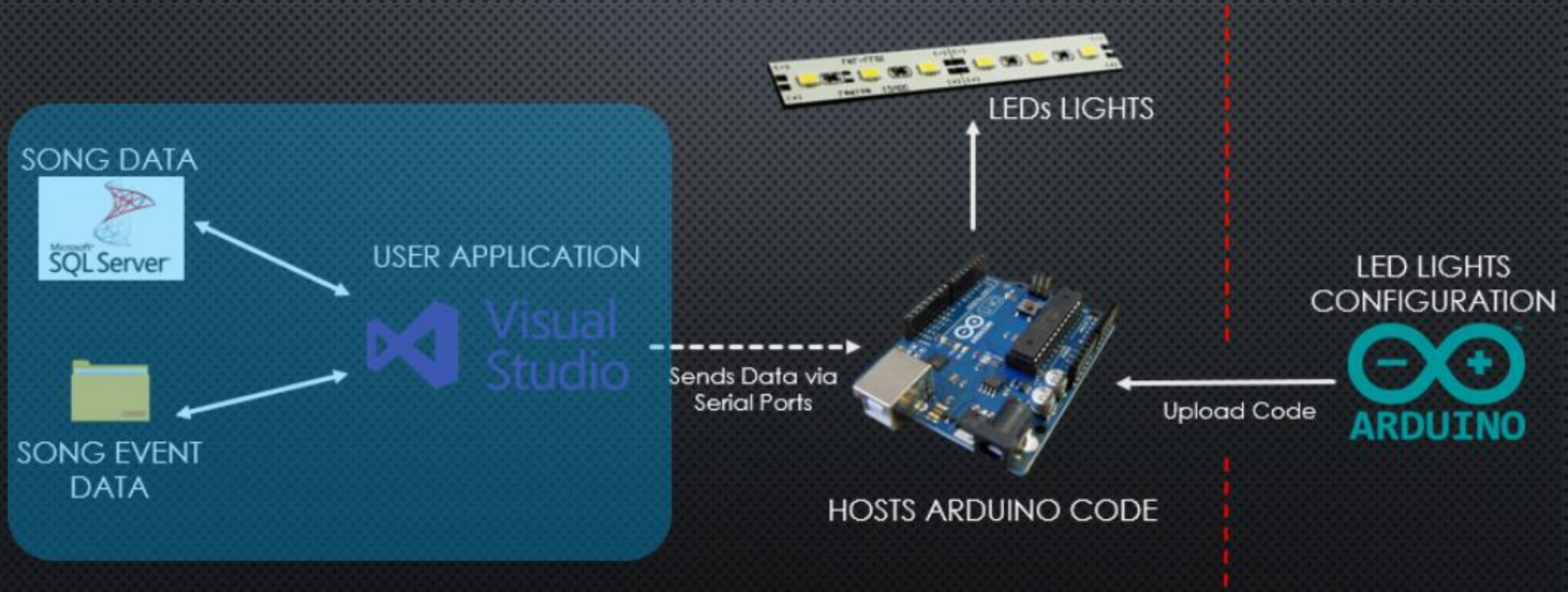
LED LIGHTS

- "THE **ARDUINO** LANGUAGE" IS **C++** OR **C (EASIER VERSION)**
- EACH LIGHT IS INDIVIDUALLY ADDRESSABLE
  - MANIPULATED VIA ARRAYS
  - CONTROL: SPEED OF LIGHTS, COLOR, DURATION, ETC…
- THE CODE IS COMPILED ON THE ARDUINO IDE AND UPLOADED TO THE ARDUINO UNO



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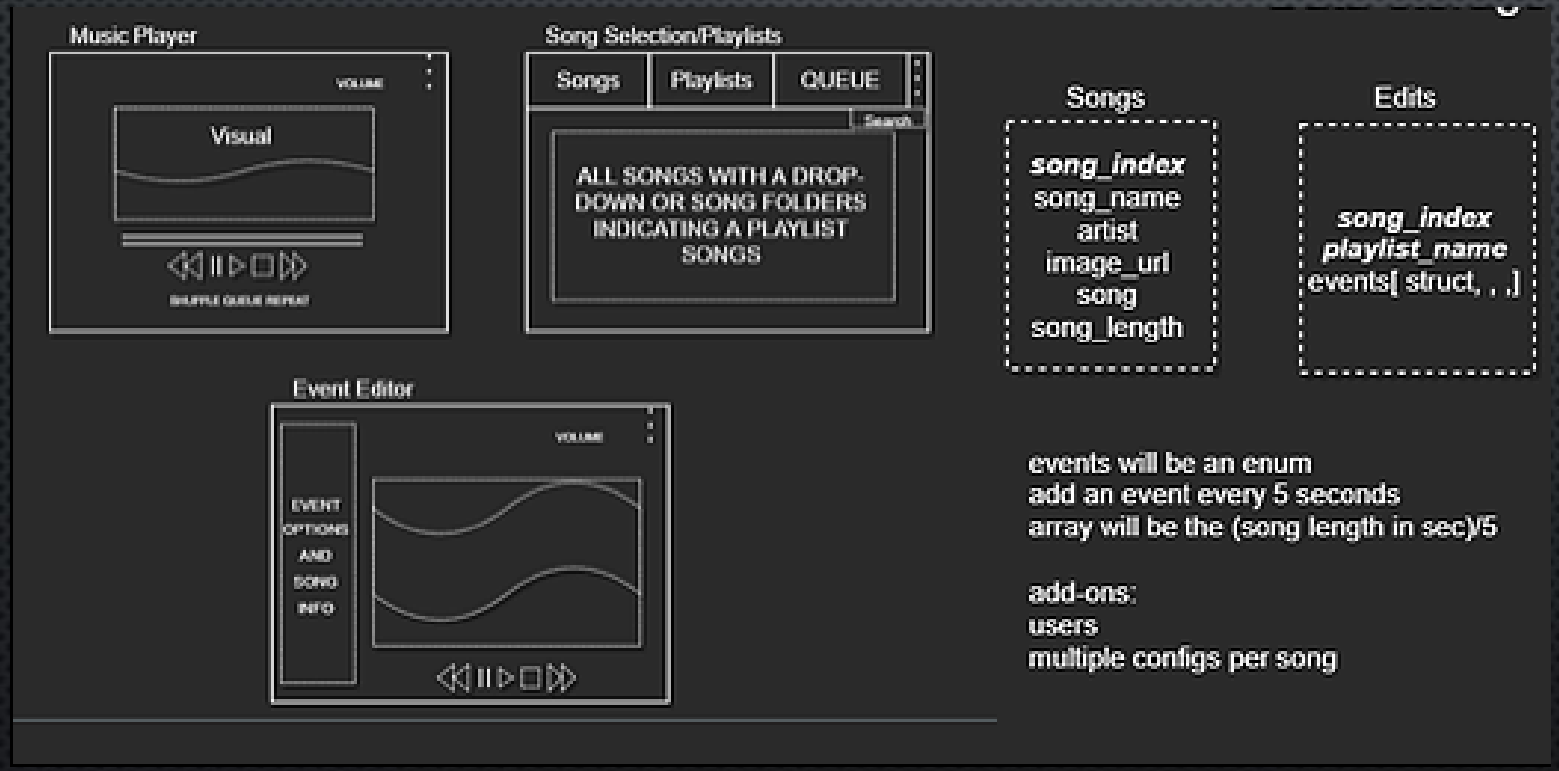
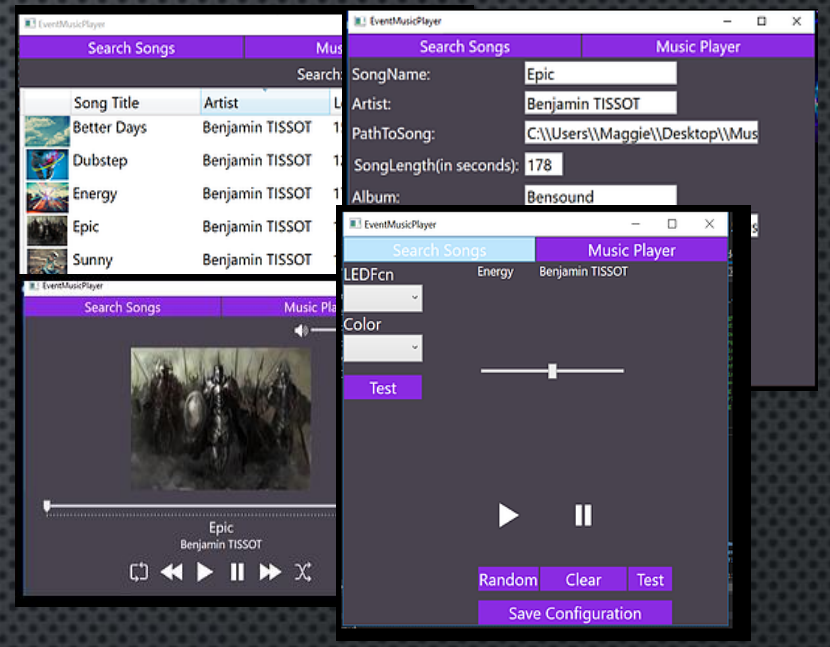
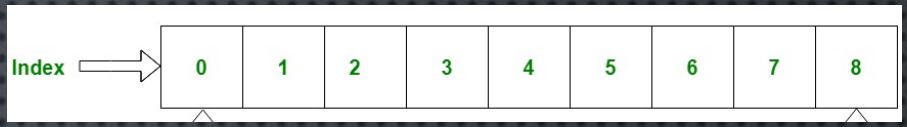
AUDIO PLAYER DESIGN

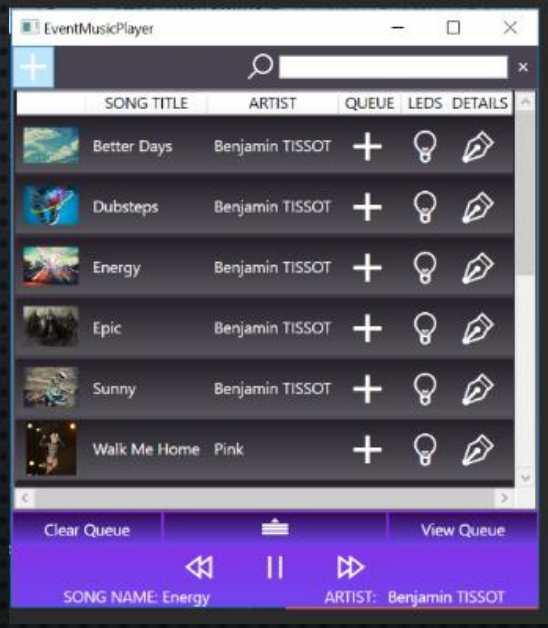


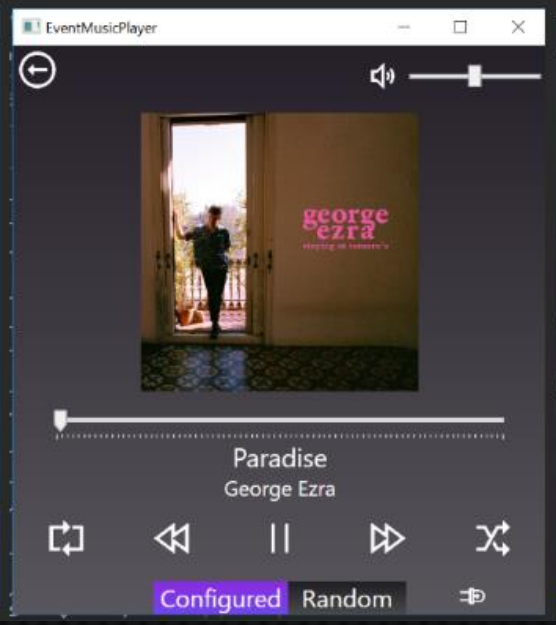


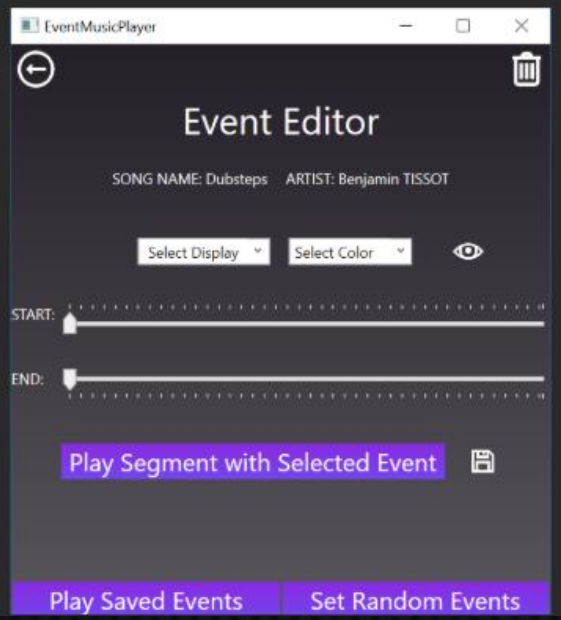
DESIGN CONTINUED…

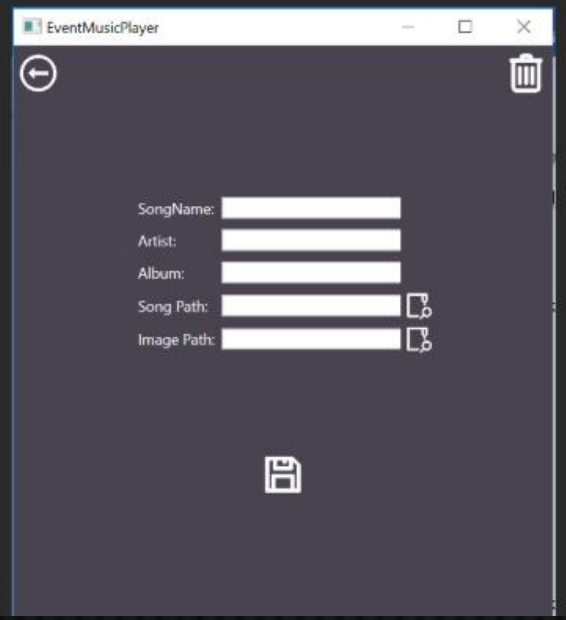
- BASIC IDEA IS THERE IS A TIMER THAT IS IN SYNC WITH THE AUDIO READER
  - EVERY TICK OF THE TIMER IS A CALL TO THE TIMER CLICK FUNCTION
  - TAKE THE FLOOR OF THE AUDIO READER/THE INCREMENT EVENT SPAN
  - TRIGGER EVENT IF != CURRENT VALUE STORED CALL EVENT
- EVENTS ARE STORED IN AN ARRAY OF STRUCTS
  - THE FLOOR OF AUDIO READER IS ACTUALLY THE ARRAY SPOT YOU ARE SENDING IN
- CURRENTLY EVENTS CAN TRIGGER EVERY 3 SECONDS OR ANY MULTIPLE OF IT AS EVENTS ARE APPROXIMATELY 3 SECONDS LONG





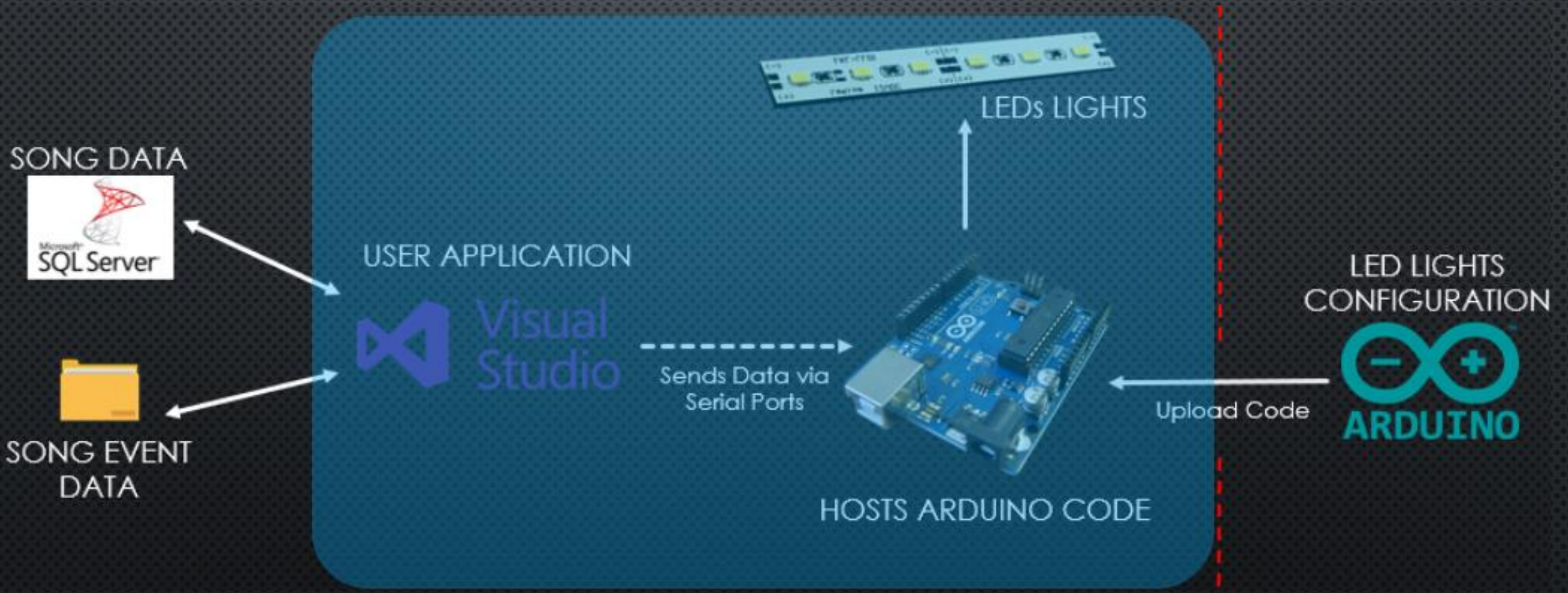






Techniques

- Async Programming
- Scaling in XAML
- MVVM Pattern
- XML files
- SQL Database
- Lists, structs, Classes, arrays, bools, etc…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How events and audio are synced

- Tell Arduino what serial port to expect data to be sent from
- Then simply write out to Arduino from C# (sends an interrupt)
  - This places the bytes into the outgoing buffer, and the buffer is then emptied asynchronously in the background by the TX-ready interrupt
- Once received Arduino parses it and executes the Function calls

EXCEPTIONS

- Ran out of time so view Queue is not fully implemented
- Must have sqlserverexpress installed and database setup otherwise exe wont run (if Time permits I might make a version of the app reading and writing to a text file)

DEMO

WARNING: Strobe lights will be used during this demo

Strategies

- Stack Overflow
- Microsoft Documentation
- Github
- PluralSight
- Professors
- Classmates

Extensions

- Determine Mood of music and create Led configurations to match it
- Add visual so user can see what section of the song has already been set
- Display sound waves

QUESTIONS