

1.1 REQUIREMENTS & CONSTRAINTS

List all requirements for your project. Separate your requirements by type, which may include functional requirements (specification), resource requirements, physical requirements, aesthetic requirements, user experiential requirements, economic/market requirements, environmental requirements, UI requirements, and any others relevant to your project. When a requirement is also a quantitative constraint, either separate it into a list of constraints, or annotate at the end of the requirement as “**(constraint)**.” Ensure your requirements are realistic, specific, reflective or in support of user needs, and comprehensive.

Functional

- The next note to be played should light up no longer than a quarter of a second after the correct note is played
- The lights should be bright enough to be seen in general lighting conditions
- The software needs to be able to recognize that the correct note/group of notes has been played within a quarter of a second.
- The software should display the next note(s) to be played
- The software should be able to read in sheet music and convert it for the device to recognize each note

Resource

- Any mobile device capable of running android or ios shall be able to run the app.
- There should be an external LED device to light up and detect notes played.
- There should be a resource that connects the phone to the LED device.
- The connection apparatus of the software to the hardware should be eligible for electrical input and output.

Physical

- The physical connection on the hardware/kalimba side should be USB A or C
- The hardware apparatus should be no heavier than half a pound
- The hardware apparatus should not increase the overall footprint by more than 5 percent of the original kalimba size.
- The color/intensity of the light should be controllable by the user
- The LED apparatus will sit around 1 cm on top of the tines and connect to the base of the kalimba so it doesn't interfere with the playability and can be transferred between most normally shaped kalimbas

User experiential

- The user should be able to add songs or portions of a song to a library
- The user should be able to remove songs from the library
- The user should be able to hear/view the song played as a preview
- The user should be able to access the tabs of the songs
- The user should be able to have a setting where the lights play at the correct tempo/time so the user can try to follow along
- The user should be able to track their note accuracy in a real time song model
- The user should be able to set checkpoints in songs (stretch goal)
- The user should be able to crop songs in order to play certain sections of songs (stretch goal)

1.2 ENGINEERING STANDARDS

What Engineering standards are likely to apply to your project? Some standards might be built into your requirements (Use 802.11 ac wifi standard) and many others might fall out of design. For each standard listed, also provide a brief justification.

After searching through IEEE standards, and some team discussion, there are no standards that we currently think we might need to use aside from the following.

IEEE Standard for Documentation Schema for Repair and Assembly of Electronic Devices

More than likely, this would be a stretch goal, as a design and prototype would have to be finalized before instruction on operation and repair could be written. This would only really become relevant if we actually wanted to sell or distribute Twinkle Tines.