SCANIANO - Brick/Sticker Scanner Piano

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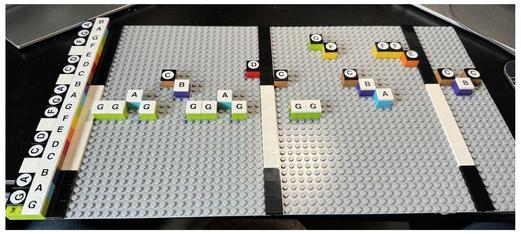
Project Objectives

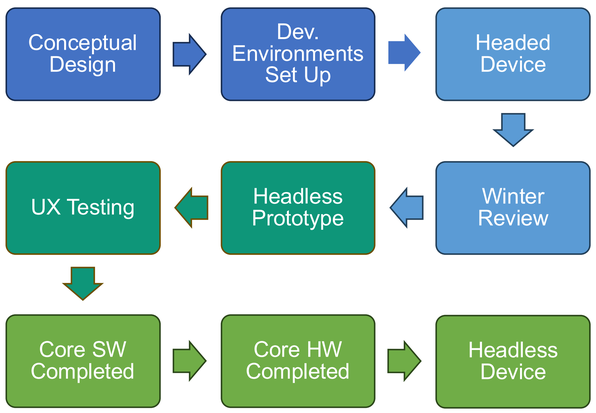
- Design a device/platform that makes exploring music easy and accessible.
- No musical skills required - designed for ages 5 to 105+.
- Must have quick turn-around for effective engagement: create, build, scan, play.
- Functionality and operation must be simple, fun, and intuitive.

System Architecture

- Notes encoded as QR codes on LEGOs or stickers.
- Handheld QR scanner for scanning in note blocks.
- Single-board computer processes input.
- Song playback via on-device button or game controller.



Key Milestones

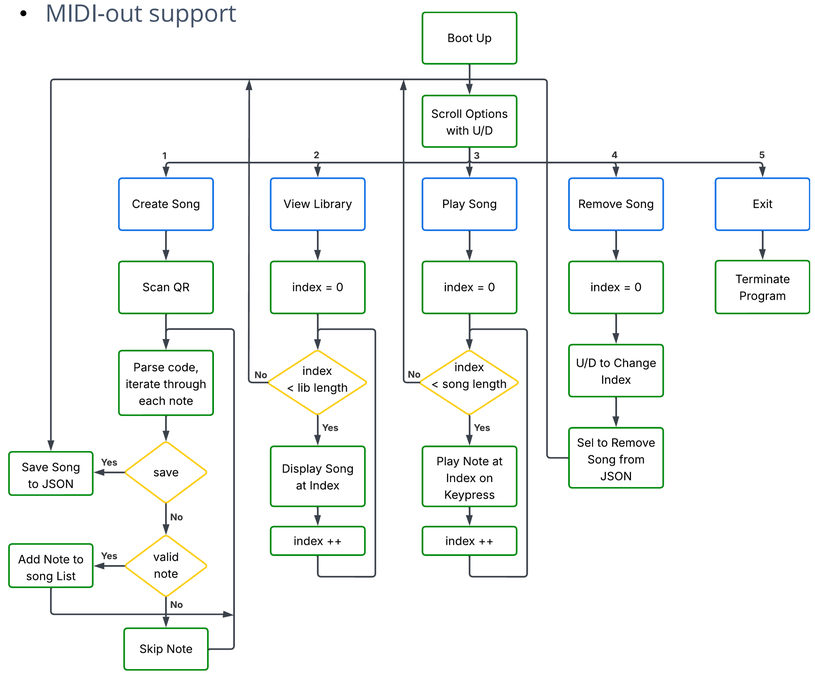


Hardware Implementation

- Raspberry Pi 4 is embedded into boombox – integrated with speakers/volume control.
- R-Pi outputs text to the LCD display.
- R-Pi receives input from the LCD buttons, connected via I2C.
- SNEW game controller and QR scanner send input to the R-Pi via USB.
- R-Pi sends output to the amplifier via headphone jack.
- MIDI out support with USB or TRS cable

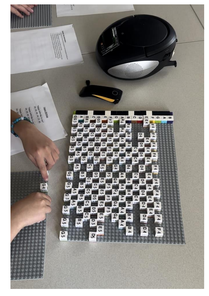
Software Features and Functionality

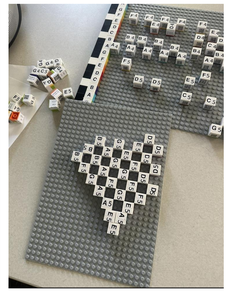
- System contains a library of notes ranging 3 octaves from middle C
- Parsing algorithm that supports single note QR codes and large QR codes containing whole songs
- Storage system to save recorded songs for future playback
- MIDI-out support



User Testing

- User testing conducted with children and adults.
- Overall positive feedback on concept and core functionality.
- Feedback used to refine UX and accessibility – ideas for future iterations
- Simple setup and operation





Intellectual Property Potential

- Patent search found no identical products; patent protection not applicable at this stage.
- Created a custom logo for Scaniano and marked it with ™ (trademark) for IP protection.
- Future work: Possible federal trademark registration and additional IP strategies as Scaniano evolves.

Future Work

- Add a “remove” function for easier song editing.
- Redesign controls for better usability by children.
- Improve block/sticker size for easier scanning
- Add chord functionality – new block designs and software support.
- Cloud server: web publishing and reading
- Single Scan Computer Vision LEGO block board reader
- Cost-reduced integrated handheld Scaniano (AKA "ScanianoMan")
- Songbooks with Large QR codes of the songs
- iOS/android app
- Left Hand Piano Play; Multiple Players

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