F.R.E.D.D.Y

RED = Commitment
GREEN = Goal
BLUE = Stretch

Audio Driver

- ❑ Convert mic input to output audio stream
- ❑ Convert input audio stream to speaker output

Audio Processor

- ❑ Feature extraction using LPF, and energy peak detection
- ❑ Feature extraction using FFT
  - ❑ Spectral Novelty
  - ❑ Tempogram
- ❑ Arrow pattern generation from features
  - ❑ Pick random arrow for each beat
  - ❑ Pick beat patterns that are subjectively pleasing
  - ❑ Difficulty: i.e. put more/fewer arrows depending on specified difficulty
  - ❑ Pick two arrows for strong beats

Memory Driver

- ❑ Flash input/output

Game Controller

Contains main game logic for project, communicates with Memory Driver, Graphics Driver, and Pad Driver to start recording or start gameplay, get steps to then display, and then check if the step is properly matched on the pads, then score and track accordingly.

- ❑ Play/Record State
- ❑ Get 4 bit Step Data from Memory Driver
- ❑ Have Arrow Matching with Switches from Pad Driver
- ❑ Proper/Synchronized preamble for falling arrows
- ❑ Proper Scoring tracking (Display on Labkit Leds)
- ❑ Score Enhancers
  - ❑ Accuracy-Based Scoring
  - ❑ Streak Multipliers
- ❑ Enhanced UI
  - ❑ Menu Screen
  - ❑ Song Selection
  - ❑ Difficulty Selection

Graphics Driver

Takes all data from Game Controller to display for the player. Using VGA, it should show the score and all of it elements as well as the next commands and where they should be executed to score.

- ❏ Interface with VGA
- ❏ Display Arrow Images
    - ❏ Scoring Region Arrow outlines
    - ❏ Falling Arrows
        - ❏ Properly synced Preamble with beat
- ❏ Display Score
- ❏ Display Streaks/Accuracy
- ❏ Menu UI

Pad Driver

Interfaces with 4 switch pad pressure plate to act as main user input for playing the game. Communicates with the Game Controller to tell it when the user is playing and has made a step.

- ❏ 4 switches
    - ❏ Properly debounced
- ❏ Interface with hardware pressure pads
    - ❏ Pull-up resistors
    - ❏ Clean and accurate with game controller