Work Breakdown Structure

February 23, 2025

Project Name: Tuner & Metronome iOS Application

- Open String Tone Generator
  - Implement Tone Generator Audio Class
    - Implement Sound Fading
    - Handle Interruptions and Closures
  - Implement Pythagorean and Equal Temperament Scale Builder Functions
  - Implement Open String Pitch Frequency Finder Functions
    - Violin
    - Viola
    - Cello
    - Guitar

- Metronome
  - Record Downbeat and Upbeat Sound Clips
    - Edit Sound Files
  - Implement Metronome Audio Class
    - Implement Accented Downbeats Selection (0-8 Beats per Measure)
    - Implement Common Rhythm Figure Selection
      - Duplet
      - Triplet
      - Quadruplet
      - Swinging Triplet
      - Swinging Quadruplet
    - Implement BPM (Beats per Measure) Selection (20-224 BPM)

- Chromatic Tuner
  - Implement Chromatic Scale Note Pitch Frequency Finder Function
  - Implement Chromatic Tuner Audio Class
  - Implement Dodecagon and Garland View Class

- User Interface
  - Lay out Tone Generator View and Controls
  - Lay out Metronome View and Controls
  - Lay out Chromatic Tuner View and Controls
  - Lay out Settings View and Controls
  - Implement View and Control Margins and Constraints
  - Come up with Six (6) Related Interface Colors
    - Blue
    - Olive
    - Purple
    - Bronze
    - Amaranth
    - Chlorophyll

    - Come up with Two (2) Additional Tones for each Primary Color for Open String Buttons
- Place Color Gradients on Views
- Come up with Control Icons and Rhythm Figure Images
- Test Application across all Compatible Devices
- Create and Design Application Icon
- Provide Application Localization
    - Spanish
    - Catalan
    - French
    - Portuguese
    - Mandarin (Simplified Chinese)
    - Russian
    - Arabic (Fusha)
    - Korean
- Find Native Speaker Subject Matter Consultants for Proofreading and Confirmation of Wordlists

Team Members:

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Glossary:

Metronome: Ticking device set in BPM (Beats Per Minute) which helps musicians keep a steady beat (pulse).

Chromatic Tuner: Tuning device that listens to a pitch and tells the nearest note to that pitch in the chromatic scale as well as its distance therefrom in Hertz (Hz) and whether the pitch is flat or sharp relative to the nearest note.

Open String Tone Generator: Tone (pure sine wave in the project) generating device for musicians to listen to an accurate reference point when tuning the open strings on their instruments.

Twelve-Tone Equal Temperament: Tuning system whereby each octave is divided into twelve notes (half steps), of which half steps the frequency (in Hz) is at a distance of 2 to the power of 1 over 12 away from a neighboring half-step. In other words, the frequencies of any pair of neighboring half steps in the chromatic scale all have the same ratio (equal to the 12th root of 2). The only pure interval is the octave. and all keys have the same intervals. Equal temperament is the most versatile tuning system as all keys are equally consonant and dissonant, with no “wolf” intervals in any key. Pianos and guitars are often tuned using equal temperament

Twelve-Note Pythagorean Temperament: Tuning system whereby the chromatic scale is built from a sequence of intervals of pure perfect fifths (frequency ratio of 3/2 in Hz) and octaves (frequency ratio of 2/1 in Hz). The strings on violins, violas, cellos, basses, ukeleles, and mandolins are tuned such that each string is at a pure perfect fifth below or above the next string.