Project Proposal: *Tempo*

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Project Overview:

Tempo will be a hardware arcade game similar to the popular mobile game *Tap Tap Revolution*. Various songs that are stored or played through an outside source will be played through the built-in speaker, and a pattern of notes will be generated corresponding to the music. The notes will be displayed in three lanes on three separate LED strips, and players will have to press the corresponding button (three total) when the note reaches the bottom of the strip. Scores and combo streaks will be calculated on the LCD shield.

Hardware Materials Required:

- Arduino Uno
- LCD shield
- LED strips [x3]
- Buttons [x5]
- Speaker
- Sound sensor
- SD card
- 1.5V batteries [x4]
- Breadboards
- Wires

Software Component:

The software component of this project will be written in C/C++ using the Arduino. It consists of using the speaker to output stored songs or a sound sensor to sense songs from outside sources, displaying the generated notes through the line of LEDs on the three LED strips. It also includes shifting the notes down towards the player and tracking the player's button presses to see if they are on time with the notes.

Anticipated Challenges:

Throughout the development of this project we expect several challenges to solve, including: getting the correct sound and pattern from the sound sensor, managing the memory used to store songs and note patterns, and accurately comparing the player's button presses with incoming notes.

Prototype Plan:

During the development of *Tempo*, we plan to construct an evolutionary prototype during the early stages and build upon it. This evolutionary prototype will include a basic display of notes through LED strips based on pre-made patterns and pre-made music and also compare the player's button presses with incoming notes. More complex features will be added to our evolutionary prototype as we continue to build upon it.